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THE MANAGEMENT OF ACUTE APPENDICITIS.[1]

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Newcastle.

It was set down many years past, and was the sense of my conceptions at that time, not an immutable law unto my advancing judgement at all times; and therefore there be many things therein plausible unto my passed apprehension, which are not agreeable unto my present self.—SIR THOMAS BROWNE: *"Religio Medici"*.

AFTER an experience of more than a thousand cases of appendicitis it is my pleasure to discuss with you today the management of acute appendicitis, which, despite its banality, often exacts the greatest patience and care. I thank you for the honour you have conferred upon me for the second time.

As the experience of many of you transcends my own, I shall pause only to stress the significance of an acute colicky abdominal pain which is diffuse, and the "sore" pain of the later stage in the right iliac fossa. It is remarkable how often careful questioning may elicit this from the history of a patient suffering from suspected chronic appendicitis. Headache, shivers and chills are signs of renal infection, and do not occur with appendicitis, except when a retrocaecal appendix secondarily involves the ureter or kidney.

Every operating surgeon has committed errors in dealing with the pelvic adnexa and their inflammations. In general, the onset of the abdominal features and the rapidity of their progress, with frequent vomiting, serve to suggest that the abdominal inflammation has been too rapid to be of appendiceal origin. The pain is not diffuse at the onset, but is lancinating and "sore" from the beginning, and the pelvic peritonitis is rapidly established.

[1] Read at the annual meeting of the Northern Medical Association on September 20, 1939, at Tamworth.

Maximum tenderness occurs over the site of maximum subperitoneal irritation (that is, the focus of maximum periappendicitis). Tension at this point, either on pressure, or on the rebound (Chicago rebound sign), or by compression of the sigmoid colon (Rovsing's sign) causes pain referred to the right iliac fossa. The line uniting this point to McBurney's point often indicates the position of the appendix, and therefore assists in the planning of the incision.

I have never encountered hyperæsthesia when the appendix is unruptured. Rigidity is a fickle sign upon which to rely when the appendix is pelvic or retrocaecal in position. Tenderness and the detection of a mass *per rectum* are most reliable signs, and may represent the only signs upon which a diagnosis may rest.

A young male adult, aged twenty-eight years, had a history of pain of five days' duration. The pain was colicky and entirely confined to the left renal angle. There were no abdominal signs whatever; but tenderness was present *per rectum* and I thought I could feel a mass in Douglas's pouch. A ruptured gangrenous appendix was removed with difficulty.

The Conservative Management of Acute Appendicitis.

Although I am emphatic that the best method of managing the early case of acute appendicitis is to remove the appendix, I am equally convinced of the value of conservative management in the following types of cases: (i) when the history is of more than forty-eight hours' duration, and a localized palpable tender mass is present in the abdomen without any signs of spreading peritonitis (Figure I); when the presence of an intraabdominal abscess

FIGURE I.

has been confirmed (it is bad practice to operate on a phlegmonous cellulitis which will in all probability settle down without intervention); then the abscess should be opened and drained through a small incision without any meddling; (iii) when, as occasionally happens, an appendiceal phlegmon is discovered at operation; the patient is best treated by mere drainage without any attempt at appendicectomy; (iv) when the surgeon is incapable of managing the ruptured gangrenous appendix without causing unnecessary peritoneal disturbance and without intestinal handling; he should so decide at the outset and employ mere drainage, for it is a practice to be deprecated first to set out on appendicectomy and then to abandon or prolong the operation because of the difficulties encountered.

It is worthy of comment that 26 patients with histories of more than forty-eight hours' duration were treated by the Ochsner-Sherren method, without mortality; 11 patients with appendicular abscess were treated by conservative surgical intervention without mortality.

The Deliberate Management of Acute Appendicitis.

In the hands of experienced surgeons, the most satisfactory method of dealing with all other cases of appendicitis is to remove the source of the inflammation—the inflamed appendix. While appendicectomy may be the easiest of surgical operations, it may represent a trial of strength, sagacity and judgement to the most experienced. The technical problems involved may require a thorough knowledge of the anatomical abnormalities encountered.

Surgical Anatomy of the Appendicular Artery.

The ileo-colic artery usually terminates by dividing into five branches, according to text-book description. The anterior and posterior ileo-colic arteries, the anastomosing caecal and ileal arteries, and the appendicular arteries are usually depicted as the terminal branches. The appendicular artery thence courses downwards and laterally behind the terminal portion of the ileum, to enter the free edge of the meso-appendix, which conducts it to the tip of the appendix. It emits during its course from seven to nine branches to the appendix, the terminal branch coursing backwards over the tip of the appendix.

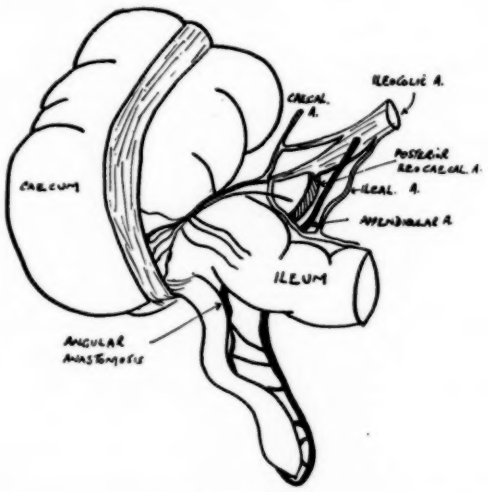

FIGURE IIA.

Pelvic position, anterior view. To show the terminal branches of the ileo-colic artery and the "angular anastomosis" from the anterior aspect.

In the specimens dissected by me at Newcastle Hospital this arrangement is not usual. The appendicular artery arises as a large branch prior

to the division of the ileo-colic artery in all these specimens. Further, it is usually stated that in 50% of cases a second artery supplies the base of the appendix. This is not borne out by my observations; in all my dissections, and in the great majority of those cases observed by me at operation, a double arterial supply exists.

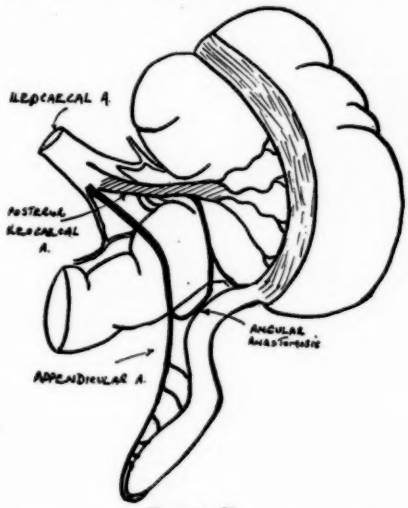

FIGURE IIB.
Pelvic position, posterior view. To show the five terminal branches of the ileo-colic artery and the "angular anastomosis" from the posterior aspect.

The appendicular artery supplies the main body of the appendix; but the proximal third of the organ is supplied by an anastomosis between the appendicular artery itself and an appendicular branch of the posterior ileo-caecal artery.

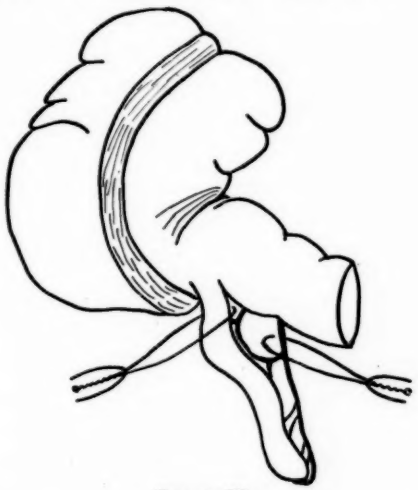

FIGURE III.
To show the method of double arterial ligation recommended.

This anastomosis usually forms an arch in the meso-appendix, but, in one specimen, was completed in the submucosa. This anastomosis may be referred to as the angular anastomosis, because it occurs in the angle between the caecum and appendix. With the pelvic appendix, the arterial arrangement is readily understood (Figures IIA and IIB), and it is obvious that the most secure hæmostasis may be effected by double ligation of the meso-appendix (Figure III). The arrangement is not so obvious in the more complex positions of the organ, although the relation of the two vessels remains the same. The retro-ileal (splenic) and paracaecal arrangements are seen in Figures IVA and IVB,

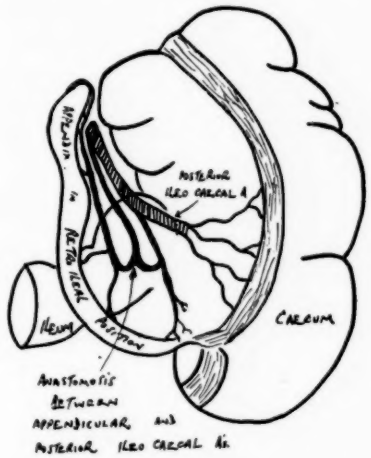

FIGURE IVA.
Retro-ileal, posterior view. The arterial arrangement in the splenic (retro-ileal) position.

which depict the position from the posterior aspect. Provided the appendix remains mobile when in the retrocaecal position (that is, possesses a meso-appendix), the operation presents no difficulties. The retrocaecal appendix, however, is often kinked

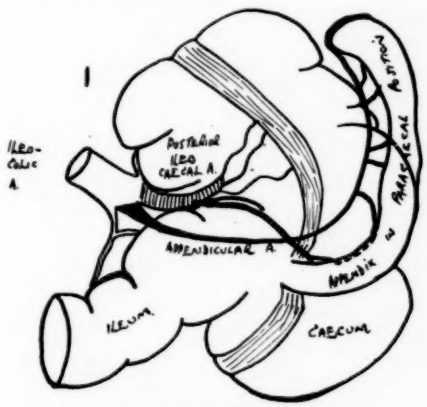

FIGURE IVB.
Paracaecal position, posterior view. The arterial arrangement in the paracaecal position.

about its centre (Figure V) or lies flat in contact with the posterior caecal wall covered by a sheet of peritoneum (Figures XIII and XIV). In such

cases the arterial arrangement is complicated by the following facts: (i) that the appendicular trunk is short and the multiple branches require to be dealt with by multiple ligatures when the operation is being performed; (ii) that small accessory branches derived from the caecal wall enter the tip of the appendix. The blood supply enters the appendix from the medial side (Figure V), and if,

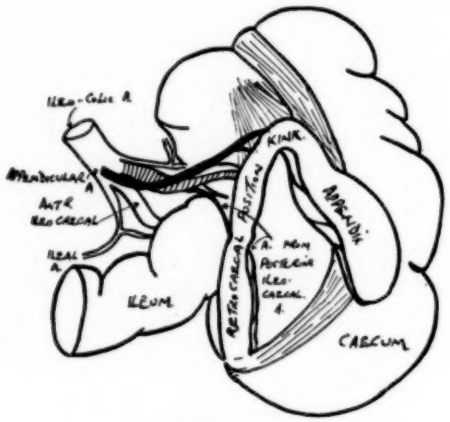

FIGURE V.
Kinked retrocaecal appendix. The arterial arrangement in the kinked retrocaecal appendix.

therefore, the lateral lamella of peritoneum or any kinking peritoneal bands are ligated, the medial peritoneal lamella remains, containing the arterial supply, and may be treated as a meso-appendix (Figure XIII).

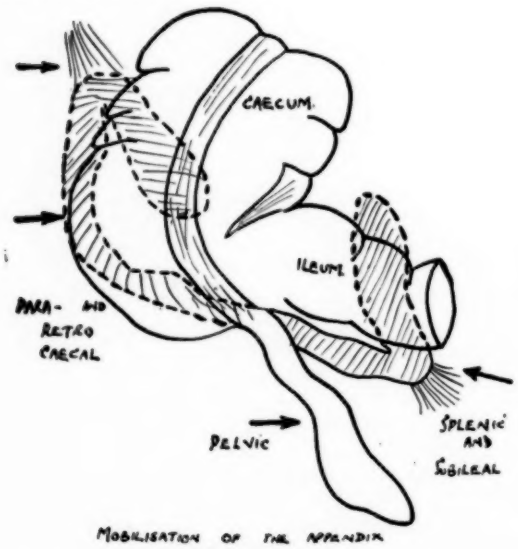

FIGURE VI.
To show the common positions of the appendix. The arrows indicate the direction in which mobilization should be pursued to avoid damage to the blood supply.

This further lesson is also obvious: that the appendix which is bound down may be freed with impunity (by separation of the lymph exudates, or ligation and division of peritoneal bands and sheets) only on the aspect away from the origin of the blood supply. Figure VI shows the common appendicular positions. The blood supply is always derived from the ileo-caecal angle. Therefore, mobilization should be effected as follows (Figure VI): of the pelvic appendix, from the lateral side; of the paracaecal appendix, from the lateral side; of the splenic appendix, from the medial and inferior aspects.

An unusual arrangement in the retrocaecal position was shown in one of my *post mortem* specimens (Figure VII). The appendicular artery

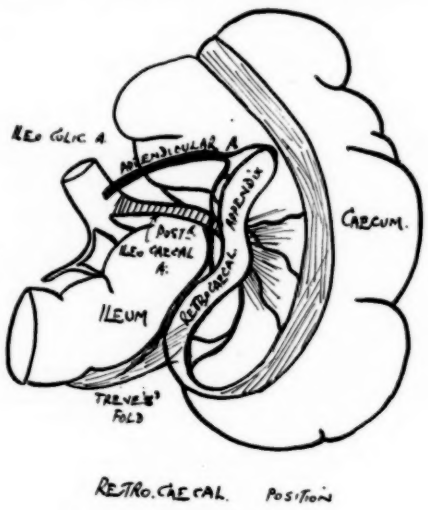

FIGURE VII.
Retrocaecal position. An unusual distribution of the appendicular artery to the top of the appendix.

arising directly from the ileo-colic trunk crossed the posterior aspect of the caecum, joined the appendix at its tip, and terminated near the appendicular base by anastomosing with the appendicular branch of the posterior ileo-caecal artery. Because of this possibility, and because the usual terminal branch of the appendicular artery encircles the tip of the appendix to become recurrent, great care must be exercised to effect hæmostasis at the appendicular tip during resection.

Comments on the Technique of Appendicectomy.

The Incision.

Unless I am in doubt about the diagnosis, or feel that an undescended caecum and retrocaecal appendix are present, I employ the McBurney incision: I find every satisfaction with the access it provides.

Figure VIII illustrates that the true McBurney incision is employed—that is, an incision perpendicular to McBurney's line and avoiding the main venous trunks of the abdominal wall. Figure IX indicates that the gridiron incision is satisfactory only if the incision in every layer intersects the incision in every other layer at the centre of the

wound. Failure to appreciate this important point is the most frequent cause of dissatisfaction with the exposure afforded by this approach.

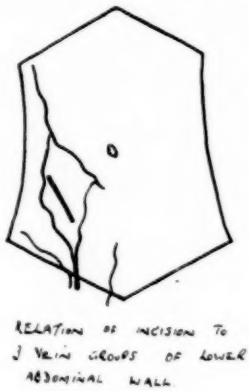

FIGURE VIII.
Relation of incision to three vein groups of lower abdominal wall. The usual incision.

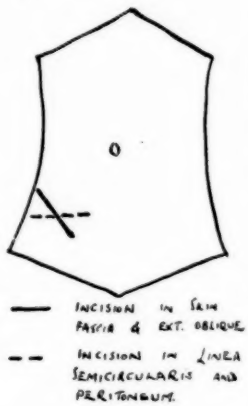

FIGURE IX.
The principle of McBurney's incision.

The *linea semicircularis* marks the line of division of the internal oblique aponeurosis into the anterior and posterior lamellæ of the rectus sheath. Through this line the fused aponeuroses of the oblique and transversus are readily divided and split laterally to expose the peritoneum (Figures X and XI). Further, should enlargement of the

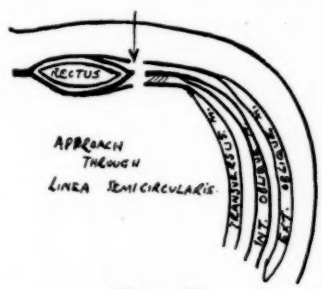

FIGURE X.
Approach through *linea semicircularis*.

incision become necessary (I have used this manœuvre only upon three occasions), the linea is readily divided caudally to increase the exposure (Figure XI).

Mobilization and Delivery of the Appendix.

By elevating the sides of the wound, I make an inspection of the right iliac fossa without disturbing the contents. Having made the reconnaissance, I introduce an exploratory index finger, and if the conditions present indicate that undesirable spread of septic material may occur during manipulation, a roll of moist sterile gauze is gently packed into the peritoneal cavity, first upwards, then medially, then downwards, to delimit the operation area.

The appendix is next mobilized, if soft lymph adhesions bind it down, by means of the index finger on the side away from the arterial origin as already indicated (Figure VI). The base of the appendix is next identified by recognition of the anatomical landmarks (Figure XII). The surgeon finds these in the following manner: (i) by follow-

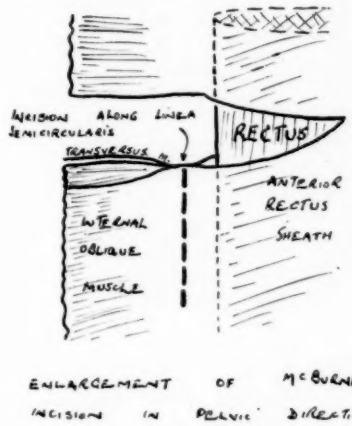

FIGURE XI.
Enlargement of McBurney's incision in "pelvic" direction.

ing caudally the anterior tænia of the caecum (which may be distinguished from the transverse colon by the absence of the omentum); (ii) by recognizing the tortuous anterior ileo-caecal artery; (iii) by recognizing the ileo-caecal junction by the

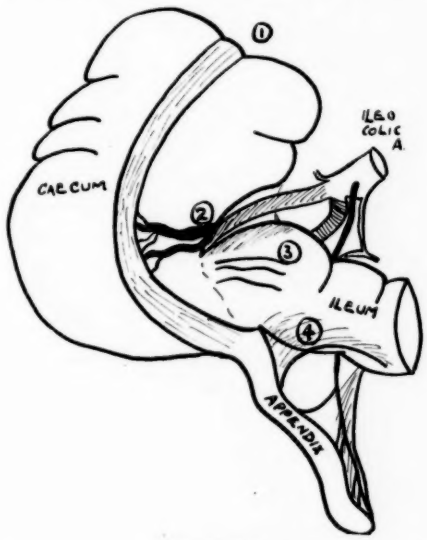

FIGURE XII.
The "appendicular landmarks": (i) anterior tænia; (ii) anterior ileo-caecal artery; (iii) terminal ileal vessels; (iv) "bloodless fold of Treves".

longitudinal vessels on the terminal portion of the ileum; (iv) by recognizing the "bloodless fold of Treves", which almost invariably contains a blood vessel.

Control of the appendicular base is now gained by the passage of a ligature through the angle of

the meso-appendix, close to the wall of the caecum, and if possible proximal to the appendicular branch of the posterior ileo-caecal artery. Where the appendix is mobile and possesses a meso-appendix, traction on this ligature is usually sufficient to deliver the appendix. When the appendix is retrocaecal in position, or bound down, or in contact with the caecal wall, the caecum must first be delivered by downward traction, then upward traction. Undue handling of the caecum must always be avoided.

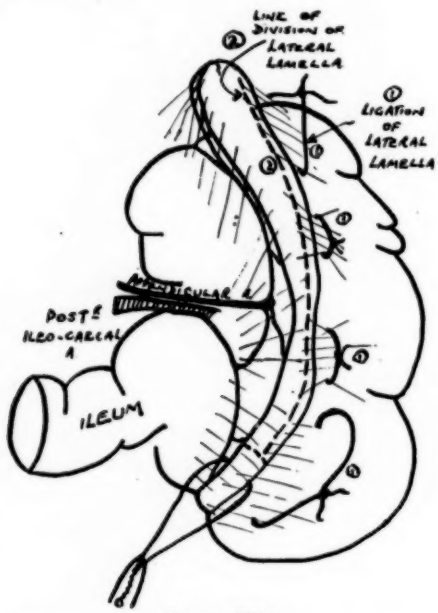

FIGURE XIII.

The lateral lamella of the peritoneal sheet binding the appendix to the posterior caecal wall is ligated and divided high up on the appendix.

When a ruptured gangrenous appendix is delivered it should be received upon a sponge, to protect the wound, which should forthwith be covered by a swab clamped in place with a Morant-Baker's or Lane's forceps; and the gloved hands should be well washed before the operation is proceeded with.

Ligation of the Blood Vessels.

If the arterial arrangement is evident and the appendix mobile, ligation is effected as in Figure III; the blood vessels are thus doubly ligated.

If the appendix is bound down, it should first be mobilized. This entails division of kinking bands or of the lateral lamella of the overlying peritoneal sheet. The ligated band or sheet is then ligated close to the appendix (Figure XIII) and the organ is lifted away from the caecal wall by being rolled towards the origin of its blood supply. In this way kinks are straightened out, and a medial lamella containing the arterial supply forms a new meso-appendix (Figure XIV). In the case of paracaecal and retrocaecal appendix, the meso-appendix may contain, not the trunk of the artery, but the branches (seven to nine) of the two arteries, and therefore may require multiple ligation (Figures XV and XVI).

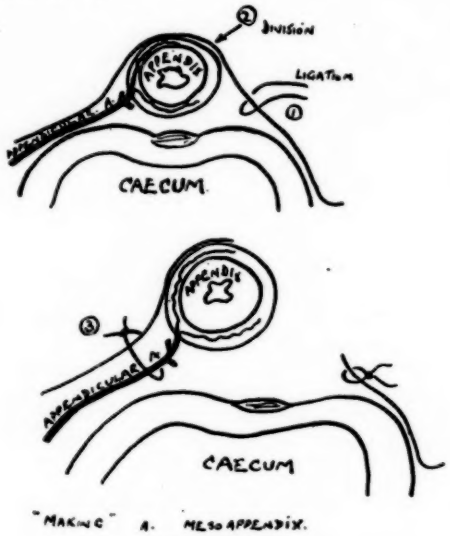

FIGURE XIV.

"Making" a meso-appendix. After the division of the lateral lamella, the appendix is rolled towards the origin of its blood supply and the medial lamella with the contained arteries is then a new meso-appendix.

The Appendicular Tip.

The terminal branch of the appendicular artery is recurrent over the tip of the appendix.

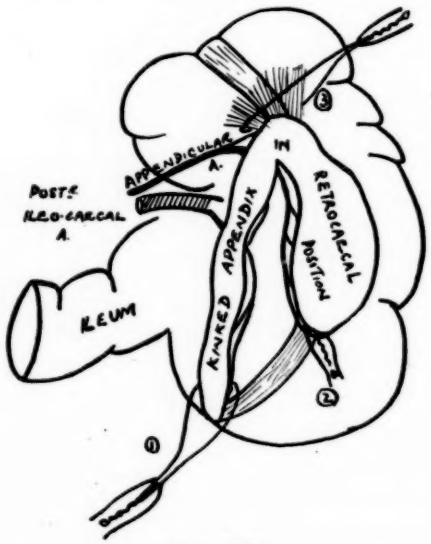

FIGURE XV.

Ligation of a kink and of the meso-appendix in a kinked retrocaecal appendix. The figures denote the plan of attack to fix (i) the base, (ii) the tip, (iii) the kink of this retrocaecal appendix.

Occasionally the main appendicular artery enters the meso-appendix at the tip of the appendix, and

small arteries may be derived from the caecal wall. These facts are of no surgical importance, except when the appendix is bound down in the retrocaecal position and the tip is difficult of access. The ease

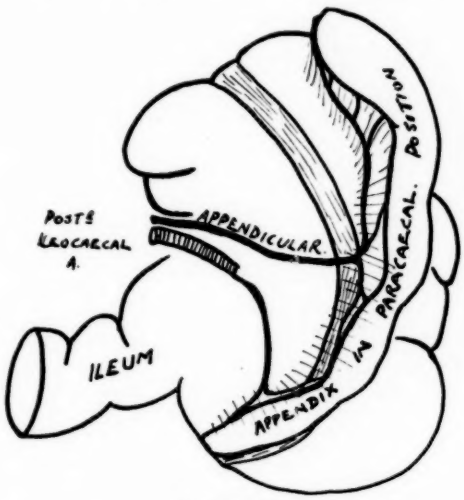

FIGURE XVI.
The ligation of this arterial supply would be multiple, so that none of the branches of the artery or angular anastomosis were overlooked.

with which an œdematous appendix may be "cuffed" down to the submucous coat is well known. Figure XVII depicts my usual method of attack on a long,

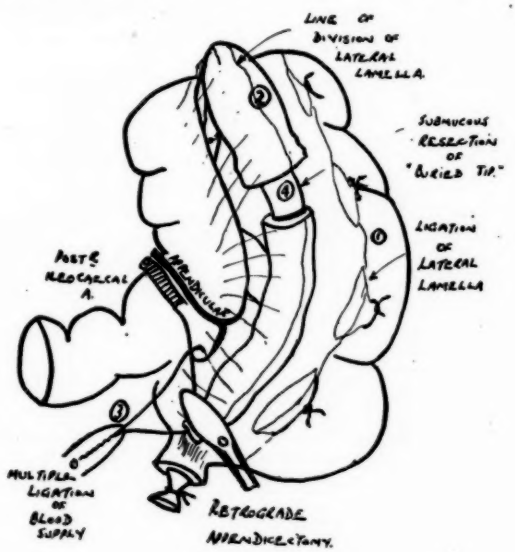

FIGURE XVII.
The plan of attack on a difficult retrocaecal appendix: (i) retrograde appendicectomy, ligation of the lateral peritoneal lamella; (ii) division of the lamella; (iii) retrograde ligation of the meso-appendix formed from the medial lamella; (iv) "cuffing" the tip.

difficult, bound-down retrocaecal appendix. The residual coats at the tip are readily picked up in a Spencer Wells artery forceps and ligated.

The Stump.

The meso-appendix is divided and the appendicular base is "cuffed" and ligated (Figure XVIII); the stump is carbolized and allowed to fall

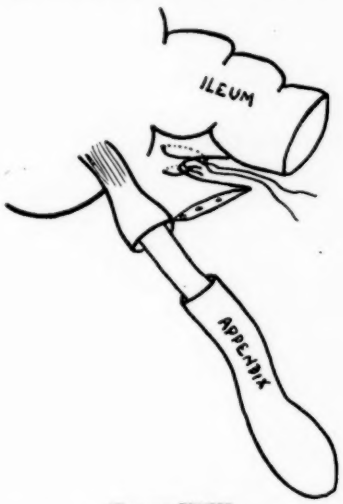

FIGURE XVIII.
Dealing with the stump ("cuffing").

back within the cuff (Figure XIX). Whether a purse-string suture is employed or not is immaterial; loud praise and "opprobrious scoffs" mingle in discussions of the advisability of its employment. I almost always employ it. It is not essential to a successful operation. I usually

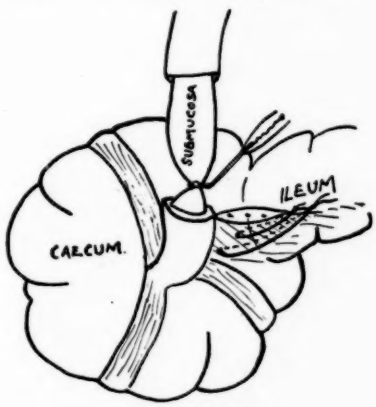

FIGURE XIXA.
Dealing with the base of the appendix.

invert the raw area on the meso-appendix against the caecal base by tying the purse-strings to the meso-appendix ligature.

Gangrenous Omentum.

When non-viable omentum has been attached to the perforated or near-perforated appendix, I resect it, employing a double row of interlocking ligatures and carefully ensuring hæmostasis subsequent to resection. Gangrenous omentum may as readily represent a focus of spreading peritonitis as does the appendix itself.

The Problem of Drainage.

Drainage of the Peritoneal Cavity (*Figure XIXB*).—When the hæmostasis is incomplete, the peritoneal exudate is purulent and foul-smelling, the intestines are inflamed, and the peritonitis is

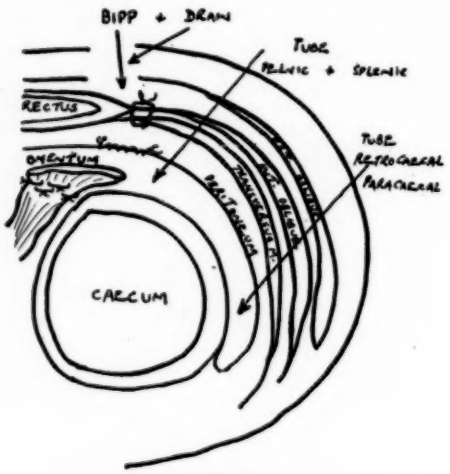

FIGURE XIXB.
Sites of drainage tubes for peritoneal drainage.

not strictly localized, I employ drainage. Although I am aware that in the hands of some accomplished surgeons good results are obtained by non-drainage, in teaching many generations of young surgeons

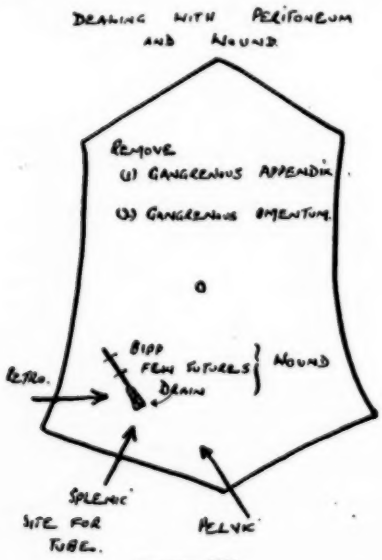

FIGURE XX.
Drainage of the peritoneum and wound.

here, my golden precept has been "when in doubt, drain". The peritoneum is drained only for a short period (twenty-four to forty-eight hours), by suprapubic drains (for pelvic and splenic appendicitis) and by flank drains (for retrocaecal and paracaecal appendicitis). The former lies in the residual cavity after removal of the appendix, and the latter drains the paracolic gutter. The rubber tubes are smeared lightly with "B.I.P.P." before introduction.

Drainage of the Bowel (*Figure XXI*).—When purulent peritoneal exudate is lying among coils of small intestine in the greater peritoneal cavity, and the peritonitis is becoming generalized, I have employed caecostomy. It is of the greatest value when employed at the time of operation, but not subsequently. It is unwise to await the onset of peritonitic ileus before considering intestinal drainage. I am indebted to Dr. S. S. Gardiner for demonstrating the great value of caecostomy in this type of case.

In my last 21 cases of spreading and general peritonitis there have been two deaths.

One patient, a child, aged five years, with a five days' history of acute appendicitis, died incontinently of post-operative shock.

The other patient was a girl, aged nineteen years, from whom a colleague had removed a subacutely inflamed appendix. On the fourth day she had vague abdominal pain of a sharp character, with considerable tenderness in the right iliac fossa and suprapubic regions. There was no rise in pulse rate, but within thirty-six hours there was a dramatic change for the worse. Well-developed general peritonitis was present. I drained a large hæmatoma of the pelvis and peritoneal cavity (already suppurating), and at the same time performed caecostomy. Repeated blood transfusions were required, but the patient made steady progress (much to everybody's surprise) to the twentieth day, when she suddenly died from a pulmonary embolism.

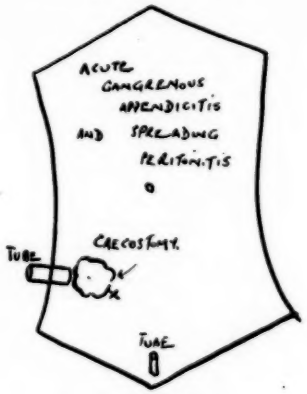

FIGURE XXI.
Drainage of the peritoneum, bowel and wound.

The caecostomy operates as a rule early and without any difficulty. There are no technical difficulties in its establishment; but there are in its closure! The diminution of meteorism and the more apparent comfort of the patient are striking features of this method of drainage. Copious intravenous infusions of 5% glucose in normal saline solution are employed as a routine, combined with gastric suction if vomiting is present.

Drainage of the Wound (*Figures XX and XXI*).—Previously the greatest cause of morbidity in my cases in which ruptured gangrenous appendices had been removed was injection of the

wound and abdominal wall. In three cases subsequent hernia was the heritage of my surgical intervention.

In twelve recent cases of acute gangrenous appendicitis, the wound has been swabbed out with "B.I.P.P.", the excess has been removed, the wound has been loosely sutured and a glove drain has been introduced for twenty-four hours into the subcutaneous fat. Thus far this method has been most encouraging, as all wounds have healed by first intention. However, the stab wound continued to discharge, and therefore the drainage tube was itself lightly smeared with "B.I.P.P."

The Fatal Complications of Appendicitis.

In my own series of cases the causes of the nine fatalities have been the following:

Acute intestinal obstruction	2 cases
Thrombosis of the ileo-colic artery	1 case
General peritonitis	3 cases
Pulmonary embolism	1 case
Pyæmia	1 case
Post-operative shock	1 case

Acute Intestinal Obstruction.

In one of my cases of acute intestinal obstruction the obstruction was recent and was due to multiple exudates coarsely matting the intestines and omentum. In the other case, however, an old band had obstructed the upper portion of the jejunum, and death resulted.

I have dealt with seven cases of acute obstruction, and they have all manifested themselves on the seventh to the tenth day. Thus abdominal pain and vomiting on or about the ninth day have justifiably been termed "the ninth-day obstruction". The features are epitomized in Figure XXII.

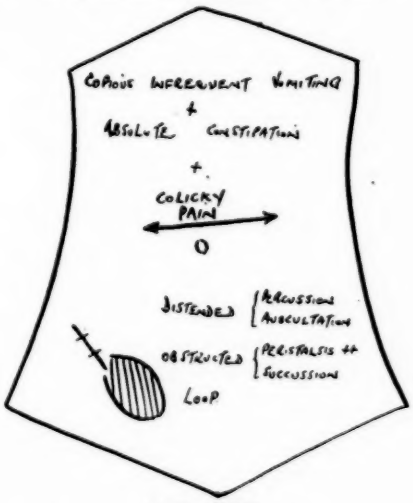

FIGURE XXII.
"The ninth-day obstruction." The features of the "ninth-day" post-operative intestinal obstruction.

When multiple obstructions of the intestine occur, the mesentery may be involved in the process or intestinal volvulus may supervene. The signs of obstruction are then combined with the signs of local peritoneal irritation, that is, local tenderness. In the absence of obvious local tenderness conservative decompression should be employed, because the intraperitoneal conditions at operation may be most disquieting, and an attempt to free the obstructed intestine may result in injury to the gut wall. Then, as a rule, resection may have to be undertaken, or peritonitis may subsequently supervene.

It is my own impression that the occurrence of obstruction is favoured by the following factors: (*a*) an excessive handling of the gut, (*b*) the leaving *in situ* of omentum of doubtful viability, (*c*) failure to perform caecostomy or other form of intestinal drainage at operation before meteorism becomes established.

I employ an indwelling Ryle's tube (Figure XXIII) such as is employed for gastric analysis,

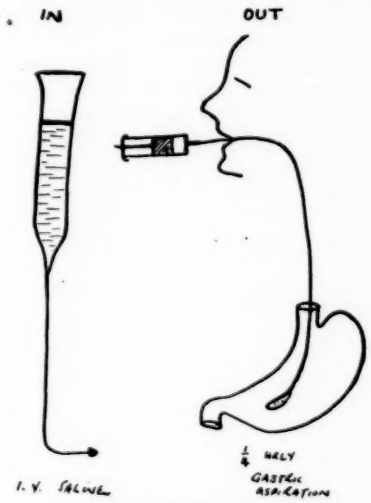

FIGURE XXIII.
The principles of Wangensteen's conservative management of acute simple intestinal obstruction (that is, without threat to the viability of the gut): (i) intravenous infusion, (ii) indwelling Ryle's tube for intermittent gastric suction and intestinal decompression, (iii) maintenance of favourable fluid balance by ensuring urinary output of 25 to 30 ounces *per diem*.

passed through the mouth or nose as the patient prefers. During the last two years I have employed this method on about thirty patients, and I think the Ryle's tube causes less discomfort than the larger tube advocated by Wangensteen. The tube is aspirated every fifteen minutes with a 20 cubic centimetre "Record" syringe; this measure is followed by lavage until the return fluid is clear.

Morphine is freely employed, and hot packs (in the absence of radiant heat) on the abdomen appear to yield considerable comfort to the patient.

The urinary output is the guide to the intravenous requirement of fluid. The output must be maintained at 25 to 30 ounces in the 24-hour period. This usually requires about 2,000 to 2,500 cubic centimetres of 5% glucose in normal saline solution *per diem*.

When the aspirations have been reduced to zero, and the abdominal features have abated, I leave the tube in position for a further eight to twelve hours and then remove it. I have discussed this subject more fully elsewhere ("The Royal Prince Alfred Hospital Year Book", 1938).

It cannot be too strongly emphasized that this conservative method of treatment has no place in the handling of any case in which the viability of the gut is in the least doubt. Laparotomy is the only approach in this type of case.

Post-Operative Hæmorrhage.

Hæmorrhage into the Peritoneal Cavity.—There are few more fatal complications than intraperitoneal hæmorrhage in the post-operative period. Three such patients have now come under my notice, none of whom had been previously operated upon by me. The train of circumstances was as follows. The patient apparently recovered from the appendicectomy; between the second and fifth days (in these cases) pain gradually increasing in severity occurred in the right iliac fossa and spread upwards to the right flank and downwards to the inguinal and suprapubic regions. The pain was sharp, but not colicky, and was accompanied by obvious and increasing tenderness. Pallor was an inconstant feature and the pulse rate did not rise to any great extent.

When the stage of infection of the hæmatocele begins there is a dramatic change for the worse in the patient's condition, and the progress of the general peritoneal involvement is rapid and inexorable. Despite any surgical intervention at this stage a rapid demise is usual.

Careful watch for these signs should be kept, and if they occur, immediate laparotomy should be undertaken; peritoneal drainage and caecostomy should be established if the hæmatocele shows any signs of infection whatsoever.

Hæmorrhage into the Lumen of the Bowel.—On the other hand, between the seventh and tenth days in the three cases observed by me, profuse sudden hæmorrhage *per rectum* occurred following appendicectomy. The loss was sudden and alarming to all concerned; the blood was bright red and contained clots, and the hæmorrhage ceased as suddenly as it occurred. There has been no recurrence. Occult blood may be detected for three or four days subsequently in the stools. In these three cases there was no interferenec with the subsequent progress of the patient, and no fatality occurred.

Suggested Origin of the Hæmorrhage.—In my opinion, failure adequately to prevent hæmorrhage from the appendicular base is the cause of recurrent intraperitoneal hæmorrhage. The anastomosis between the appendicular artery and the appendicular branch of the posterior ileo-caecal artery is not always controlled by a single ligation of the meso-appendix, and reactionary hæmorrhage may occur through the patent appendicular branch of the posterior ileo-caecal artery (Figure XXIV).

Further, the picture of intracaecal hæmorrhage is that of the sudden rupture of a hæmatoma or of a sudden reactionary hæmorrhage from a raw area in the *caput caeci*. This is derived from the appendicular stump, which with its accompanying accessory appendicular artery has been inverted by the purse-string suture. It is worthy of note that there has been no sign of infection in the cases which have come under my notice, although recent cases reported in the literature of abscess in the *caput caeci* about the inverted stump would appear to suggest that infection might play a part in the promotion of the hæmorrhage.

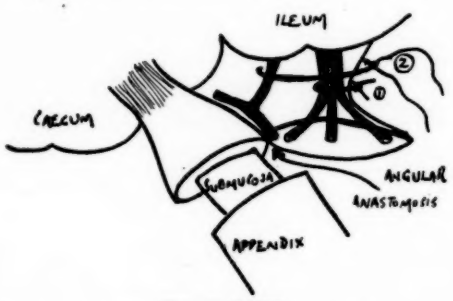

FIGURE XXIV.

Ligature 1 fails to include the angular anastomosis, which may subsequently bleed. Ligature 2 is in the correct position for control of hæmorrhage.

Thrombosis of the Ileo-Colic Artery.

A male patient, aged twenty-eight years, had an appendicectomy for subacute appendicitis. On the tenth day of convalescence, when in process of discharge from hospital, he was seized with sudden umbilical colic and within four hours had vomited four times. The vomitus was on each occasion copious and green in colour. There developed loud peristaltic sounds in the right iliac fossa, borborygmi audible with the stethoscope, succussion and signs of a distended loop. I performed laparotomy and separated a loop of ileum adherent to the scar. The progress was satisfactory till the sixth day, when delirium with mild euphoria and the signs of a spreading peritonitis occurred. This proved fatal, and at *post mortem* examination gangrene of the caecum, adjacent part of the ileum and ascending colon was found.

I think that I should now prefer conservative treatment by gastric aspiration and intravenous infusion for an obstruction of this type. My surgical intervention may have been the promoting cause of this thrombosis.

General Peritonitis.

In my own fatalities from spreading peritonitis, the following cases are worthy of comment.

A male patient, aged twenty-seven years, was operated on for a ruptured gangrenous appendix which had been present for fifty hours. The omentum had "walled off" the rupture with moderate efficiency. I removed the appendix, dropped back the omentum, mopped out the peritoneal cavity, and closed the abdomen without drainage. On the third day signs of a spreading peritonitis developed, and the patient died on the sixth day.

Now in view of my experience, I would remove the omentum (which had become gangrenous, as shown *post mortem*) and drain the bowel, peritoneal cavity and wound.

A child, aged seven years, had a ruptured gangrenous appendix, present for forty-six hours. I drained the peritoneal cavity and the wound. The following day the condition of the patient was satisfactory, except that disquieting distention of the abdomen was present and meteorism was increasing. Upon the third post-operative day distention became pronounced, the bowels could not be opened by enemata or any other means, and vomiting commenced. The child died on the fifth post-operative day.

I would now perform caecostomy in such a case.

It is worthy of comment that in the 21 cases of spreading peritonitis in which I have performed caecostomy, only one death has occurred, and that from post-operative shock.

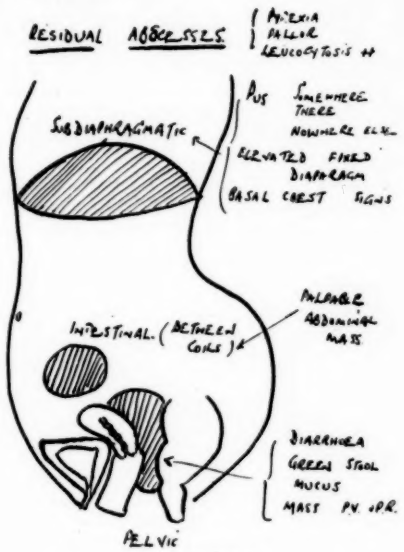

FIGURE XXV.
The main features of intraperitoneal abscess following appendicitis.

Post-Operative Intraperitoneal Abscess.

I have drained only three abscesses following appendicectomy; nevertheless, I have seen twelve patients who sustained a diffuse pelvic or right iliac cellulitis following the operation. Surgical intervention should not be undertaken because of the existence of an intraperitoneal mass; it is necessary first to confirm the presence of pus before drainage is attempted. Anorexia, pallor which increases, meteorism, the presence of a palpable mass and an increasing leucocyte count are necessary for confirmation.

On the other hand, subphrenic abscess may elude the most careful observer. These features should be supported by fluoroscopic examinations before the presence of the abscess may be regarded as definite.

Two patients had a pelvic and one had a subphrenic abscess; all three recovered.

Subacute and Chronic Appendicitis.

Every surgeon, and others, must regret at some time or other having performed appendicectomy for right iliac pain, which is unrelieved by the operation, and for the relief of which the patient makes frequent post-operative visits. The examination of large numbers of appendices, removed as a routine measure during gynæcological operations, indicates that definite changes of chronic inflammation may be evident, but the clinical history may not support the pathological evidence. It is on that account that I have become more and more conservative in the assessment of the case for operation and demand definite evidence of previous attacks of subacute appendicitis.

In this regard, the importance of the diffuse colic of the first stage, followed by the stage of right iliac localization, cannot be over-estimated. Although the presenting features may now be confined to the right iliac fossa, a careful pursuit of the early history, the site of the early pain, the accompanying anorexia, and the absence of headache, of chills and of urinary symptoms are of assistance in indicating the site of the trouble. I always make at least two microscopic examinations of the urine, and do not hesitate if I am in doubt to seek the assistance of the radiographer regarding the freedom or otherwise of the kidney from stone.

Statistics.

Because so few statistics are interesting, and because the mark of veracity is questionably attached to some, I have, with becoming reserve,

TABLE I.
Statistics concerning 1,418 Cases of Acute Appendicitis, in which the Number of Deaths was Nine (0·7%).

Classification.	Number of Cases.	Number of Deaths.	Percentage of Deaths.
Age distribution in decades—			
First	136	2	—
Second	612	2	—
Third	348	3	—
Fourth	188	1	—
Fifth	80	—	—
Sixth	36	—	—
Seventh and after	28	1	—
Pathological classification—			
Subacute and chronic appendicitis	650	2	0·3
Acutely inflamed, non-ruptured appendix	568	4	0·7
Ruptured gangrenous appendix	144	3	2·0
Abscess	11	0	—
Position of the appendix in 874 cases—			
Retrocaecal	40%		
Paracaecal	18%		
Pelvic	36%		
Splenic	6%		
Operations performed—			
Appendicectomy	1,201	4	0·3
Appendicectomy with drainage	140	4	2·8
Appendicectomy with drainage and caecostomy	21	1	5·0
Drainage only	11	—	—
Totals	1,373	9	0·6
Non-operative cases—			
Ochsner-Sherren method	26	—	—
Miscellaneous	19	—	—
Wound discharge[1]*—*			
Blood	12	—	—
Serous	74	—	—
Purulent	58	—	—
Fæces	8	—	—
Total	152	—	11

[1] Average period of morbidity from infected wounds, 21 days.

deferred my figures to the end of this address (Table I). I trust that on that account they will not prove the less digestible.

Summary.

1. The indications for conservative management of acute appendicitis are discussed.
2. The blood supply of the appendix in its various positions is discussed as a basis upon which the operation should be planned.
3. Various points in the approach are discussed.
4. A plan of attack for the difficult appendix based on anatomical considerations is discussed.
5. Drainage of the peritoneum, bowel and wound, and the indications for drainage are discussed.
6. The value of caecostomy is emphasized.
7. The features and therapy of post-operative intestinal obstruction are considered.
8. The features of post-operative hæmorrhage are indicated and a suggested cause is advanced.
9. A case of post-operative thrombosis of the ileocolic artery with gangrene of the terminal portion of the ileum, the caecum, and the ascending colon is described.
10. Certain features of residual abscess are emphasized.
11. The importance of carefully assessing the case for operation in chronic appendicitis is discussed.
12. Certain statistics are presented.

Acknowledgements.

My acknowledgements are due to the honorary and resident medical staffs of the Newcastle Hospital for their ready help and encouragement in the treatment and review of this series of cases.

CHEMOTHERAPY IN THE TREATMENT OF GONORRHŒA IN MALES.

By V. N. B. WILLIS, M.B., Ch.M. (Sydney),
Brisbane.

DURING the past eighteen months numerous articles have appeared in our medical literature claiming almost miraculous results in the treatment of gonorrhœa by sulphanilamide, "Uleron", "M & B 693" *et cetera*. May I mention that the most carefully compiled of them lay great stress on the necessity for applying very careful tests of cure to each case. This latter point is apt to be overlooked. As in the past, when any new method of treatment arises the claims for its advantages are not always maintained as time passes and as we are enabled to investigate them more thoroughly.

The impression has gained a hold on the medical profession and the public that to cure gonorrhœa nowadays all that is necessary is to take a few tablets in water for a week or two and all will be well.

There is no doubt that chemotherapy has altered the treatment of gonorrhœa enormously. This had remained stationary for the past twenty-five years. We now have a definite advance. The sulphanilamide group of drugs will as a rule rapidly bring about the cessation of the most prolific urethral discharges, even when taken in such small doses as 0·5 gramme four times daily. They also act at times in a miraculous manner in preventing the onset of acute posterior complications. They are of the greatest value in the treatment of what we may term "the acute stage of the urethritis". However, anyone who has had to deal with a number of cases of gonorrhœa and has used these new compounds must have been struck by the lack of any favourable response in certain cases, the usual difficulty being that the discharge returns as soon as the drug is withheld, or else that the drug has no effect at all on the disease. I should like if possible to put forward some explanation of these failures.

Now there can be no accurate answer to the question: In what portion of the urethra does the infection start? In other words, what does the gonococcus do when it gets into its new environment? It is impossible to experiment with this organism in the laboratory; but I should like to see how it behaves when placed on healthy mucous membrane. Does it bury itself beneath the surface and remain quiescent possibly a quarter of an inch inside the meatus? Does it travel backwards beneath the surface towards the bladder? Does it spread by the lymph channels before any discharge appears? And lastly, does the infection ever start in the posterior portion of the urethra?

As we are unable to answer any of these questions, we can only fall back on our clinical experience in the study of this infectious and distressing complaint.

Classification of Infections.

Patients suffering from a first attack of gonorrhœa may be divided roughly into two classes; these are class I (the early acute type of infection) and class II (the late acute type of infection). In the early acute type the infection is just starting; the incubation period is less than one week and the duration of the discharge is less than two days. In the late acute type the infection has lasted for over one week, or else the incubation period has been over two weeks.

Class I.

The early acute type of case has always responded very well to treatment. The disease cannot have become very deep seated, for it has had, at the most, only about nine days' start. In the past a few irrigations and a potassium citrate mixture were often enough for cure. Many patients were so easy to treat and responded so satisfactorily to these measures that I believe some would even have recovered with no treatment at all, as long as they abstained from alcohol and sexual activity. In other words, the natural resistance of the patient was so high or else the toxicity of the infecting organism was so low that the patient threw the infection off without much outside help.

In this class of case I wish to stress the point that almost any form of treatment will effect a cure. Following on this, one may say that to stamp out gonorrhœa one must get hold of the patients as early as possible; hence the importance of the practice in the last war of careful medical inspections of all men returning from leave. The army medical officers were able to discover cases of infection before the patients themselves were aware that anything was wrong, and by the use of argyrol instillations were able to abort numerous early infections.

I should say that under present conditions 50% of patients come under this first heading. When they are treated by chemotherapy the results, as would be expected, are excellent, and I really believe that they are cured by "taking a few tablets", much to the benefit of any statistics that we may be keeping; we can claim 100% cure in 50% of infections.

Class II.

In the late acute type of infection the urethral discharge has lasted over one week, with one week's incubation period, or else the discharge has lasted over two weeks. In other words, the infecting organism has a start of at least two weeks.

It is in this class that the improvement with sulphanilamide seems even more satisfactory than in class I. The rapidity with which the copious discharge disappears is often amazing; scalding and frequency of micturition are controlled, and the urine which may be loaded with pus becomes clear in a few days.

In the past, with irrigation treatment alone the average time before the discharge ceased in these cases was about four weeks; now, with chemotherapy and local treatment, we find this period frequently reduced to one week. In regard to the above, may I quote from a paper in *The British Medical Journal* of June 17, 1939, by J. Sommerville, of Glasgow: he states that he began treatment with "M & B 693" only, one tablet four times daily, but to reduce relapses he went back to irrigations with potassium permanganate as well.

And so we now find that we can cut down the duration of the most distressing stage of the disease by at least 75%. This is a very great advance in therapy.

How has this result been obtained? We do not know yet from experiments in the laboratory. The action of this group of drugs is still under investigation. For example, we find the following statement in a recent number of *The Journal of the American Medical Association* concerning the concentration of the drug in the blood:

> This varied from 1 to 18 mg. per 100 c.cm. but there was singularly little difference in therapeutic effect between groups of patients showing respectively low and high concentrations.

We do not know how these drugs act. We can only use our clinical knowledge and experience to estimate their curative value. They do cause a rapid cessation of the urethral discharge. The question must then be asked: Is the patient free from his infection when all his acute symptoms have disappeared, or has it merely become dormant?

Standard of Cure.

This brings up the necessity for us to use some standard of cure for gonorrhœa which should include the following observations: (i) no urethral discharge; (ii) no threads in a fresh specimen of urine; (iii) prostrate gland and vesicles draining freely, the expression being microscopically free from pus cells; (iv) Cowper's glands not palpable; (v) no reaction after full urethral dilatation; (vi) no reaction after intercourse with the use of a condom.

Under irrigation methods the average duration of treatment and observation has been in the past from ten to twelve weeks. At the end of this period the patient, having passed the above tests, could be told that his infection was cured and that no damage remained behind. What did we find when applying the above tests? (i) That the infection had always involved the posterior portion of the urethra to a greater or less extent; consequently (ii) that there was always some involvement of the spermatic vesicles, which required massage to promote free drainage; and (iii) that when this vesiculitis had settled down, gradual dilatation of the urethra up to its normal size was a comparatively easy procedure.

The course of the disease was as follows. During the three or four weeks that the acute stage lasted, owing to the time factor, the whole of the urethral canal became involved. We never had to deal with anterior urethritis only, in patients of class II. The infection spread back to the vesicles, and if treatment was directed to the prevention of any blockage in these structures by the promotion of free drainage, the natural resistance of the patient was able to overcome the disease. Absolute rest to the part, that is to say, no sexual activity and abstinence from alcohol, was a most important factor in rapid cures.

Now, what do we find when we come to apply these same tests of cure to patients who have been treated by chemotherapy and local treatment? First, that all those patients belonging to class I, the early acute type, will recover without any trouble. The infection has not had much time to develop. The results are excellent. Secondly, that the patients in class II, the late acute type, are not disposed of quite so easily. For example, under sulphanilamide treatment all acute symptoms have subsided, the discharge has stopped and the urine is clear by the end of the first week. We massage the prostate and vesicles; they are draining freely and the expression is normal microscopically. Apparently the posterior portion of the urethra has not become involved. We may repeat this test two or three times, each result being satisfactory. The next step is to pass a small curved sound or gum elastic bougie, say size 8, down the urethra back into the bladder. If the urethra is normal, the urine passed by the patient after this procedure will be

quite clear. Small threads in the freshly passed urine show that some irritation is still present, and a trace of blood at the end or the presence of small blood clots denotes that we have to deal with patches of soft infiltration. I have been particularly struck by the number of patients who are "apparently cured" after taking sulphanilamide, but who react to this simple procedure. Within twenty-four hours they have a recurrence of discharge containing gonococci and a return of threads to their urine—evidence that the infection was lying dormant somewhere beneath the mucous membrane.

The patches of soft infiltration mentioned above will presumably heal in time with the formation of fibrous tissue. This will contract, and the patient will then have a stricture unless gradual dilatation has been instituted.

This failure is rather a strange occurrence. By the older methods of treatment we found that the infection tended to become dormant in the prostate gland and vesicles, whereas with chemotherapy it tends to do the same thing just beneath the mucous membrane, usually in the anterior portion of the urethra.

I have found that to bring these patients, those in the second class, up to the standard of cure after their acute symptoms have subsided, takes almost as long as it did in the old days. The small threads in the urine seem very unwilling to disappear. The acute symptoms last for a much shorter period; but it takes longer to apply the tests, as we find it necessary to repeat the dilatations with the same sized instrument owing to the slowness with which the soft patches heal.

Chronic Cases.

Now let us leave the acute cases and inquire how chemotherapy acts when used in chronic or long-standing cases or in relapsing cases. The immediate results are excellent. All the acute symptoms subside in a few days with sulphanilamide, whereas this effect was often a matter of weeks under irrigation treatment. Nothing is more striking than the rapid clearing up in some instances of the turbid urine, and the action of the drug in stopping acute posterior complications is at times almost magical. But chemotherapy has little or no effect in these long-standing cases if the infecting organism is blocked in some deep focus. It is useless if the spermatic vesicles on palpation are found to be enlarged, thickened and surrounded by fibrous infiltration, and if on massage no material can be expressed at the meatus—an indication that they are not draining. In such cases, when the vesicles are blocked or when the expressed material is loaded with pus, treatment by massage and gradual dilatation must be instituted before a cure can be expected. Naturally, nothing but the promotion of free drainage will be of any use. Furthermore, chemotherapy has no effect on what I may term "vesicular toxæmia", which in the past has been the most troublesome sequela of gonorrhœa. Patients suffering from loss of weight, indigestion, rheumatic pains in the back and limbs, joint disorders, sexual disabilities and general ill health, all of which may arise from absorption from infected vesicles, are not improved by these drugs. I believe that in the future we shall meet with more of these cases, because owing to the rapid disappearance of all acute symptoms with chemotherapeutic treatment the necessity for complete examinations will be overlooked. In the past the infection always involved the vesicles, and I think it will continue to do so.

It is unfortunate that the average patient considers he must be cured if he sees nothing wrong and is therefore unwilling to have his "rectum examined". It is also a pity that the medical profession does not always realize that small threads of mucopus or specks of pus in freshly passed urine may be more serious than an acute discharge. They indicate some curable focus of irritation, and are often the only sign in toxic conditions which might prevent removal of teeth and tonsils. They are not found in normal urine and should always be investigated.

Case Histories.

The following case histories illustrate some of the points I have mentioned above.

CASE 3847.—A male, aged thirty years, was seen on September 2, 1939, with a yellow discharge containing gonococci, cloudy urine and slight scalding on micturition. The duration of symptoms was one day only; the incubation period was seven weeks. Under treatment with irrigations and "Sulphonamide P", 0·5 gramme three times a day, the patient lost his discharge and his urine became clear within one week. Massage was then applied three times, the expressed fluid containing merely a few pus cells, the vesicles feeling normal. The urine was quite clear after curved sounds, size 14/18 and 16/20, had been inserted, the last on September 30, 1939. He returned with a recurrence of the discharge and cloudy urine on October 3, 1939. Once again gonococci were seen on the slide.

This patient had been apparently cured with one week's treatment. Routine tests disclosed that the cure was only apparent. The cause of failure was probably the seven weeks' incubation period. I had never previously seen a patient with such a lengthy incubation period; but recently Dr. F. N. Waddell, of Cessnock, has sent me his notes of a similar patient whom he has just treated. Perhaps chemotherapy at the source of his infection had altered the toxicity of the organism. He was not in class I.

CASE 3855.—A male patient, aged 51 years, was referred to me on September 26, 1939, with a yellow discharge and turbid urine. His infection was fairly acute; gonococci were seen on a microscopic slide. There was a history of a discharge starting three months previously. The patient had been treated by his own doctor with "M & B 693". His discharge had stopped and recurred two or three times. At the end of a week's treatment by irrigation, his acute condition having subsided, his vesicles were found *per rectum* to be enlarged and draining thick pus. This condition cleared up in three weeks' time.

"M & B 693" will not effect a cure when the prostate and vesicles have become badly infected.

CASE 3857.—A male patient, aged twenty-three years, was seen on October 3, 1939, with œdema of the foreskin, profuse discharge and turbid urine. Gonococci were visible on the microscopic slide. The discharge was stated

to have started three weeks previously. His doctor had prescribed tablets and the condition had cleared up completely. Then he was given an injection into his buttock (I presume a prophylactive vaccine), with the result that the discharge recurred as above.

This case emphasizes the necessity for some test of cure.

CASE 3859.—A male patient, aged forty years, was seen on October 9, 1939. He looked ill, and stated that a urethral discharge had developed nine weeks previously. He had had no previous trouble. He had been taking "Albucid" and "M & B 693" tablets continuously since then. He stated that he had no discharge, but that he did not think that he was cured. He had lost over one stone in weight and was very worried.

On examination he was found to have a minute thin discharge and his urine was quite clear except for a few specks of mucopus. To my surprise, on the microscopic slide typical Gram-negative intracellular diplococci were seen. On rectal examination his vesicles were found to be big, brawny, tender and only just draining.

Chemotherapy therefore does not kill all gonococci, even if continued for long periods. This patient's loss of weight, vague pains and discomfort were due to "vesicular toxæmia". Signs were practically nil. Usually these patients pass a large number of small threads in the urine, which put us on the track. However, the unexpected result of examination of the microscopic slide made the diagnosis easy.

Discussion.

In using chemotherapy in the treatment of gonorrhœa, as I have tried to show, we do not know exactly how it acts. We can only use our clinical experience in estimating its beneficial and curative effects. It is now necessary to decide how we should answer the following four questions:

1. Should we start using the drug at once, or wait for the natural resistance of the patient to develop? I think that we should start at once, because we may abort the infection if it should be acute. If we wait, the posterior portion of the urethra will have become involved, as it is only then that the natural resistance of the patient begins to develop.

2. What strength of drug should we use? I have used only the minimum dose of 0·5 gramme three times a day. The clinical results are excellent with these doses, and all toxic effects are absent. Why take any risks?

3. How long should we continue the use of the drug? If no improvement occurs in one week, it is wise to give a week's spell before repeating the treatment for another week. If there is then no clinical improvement we are dealing with a closed focus, and further chemotherapy is useless, as was shown in one of the cases quoted. Whether the drug is harmful if its administration in small doses is continued, we do not know. It is certainly toxic in large doses.

4. Is local treatment necessary as well? I can only draw attention again to the report of J. Sommerville, of Glasgow. When we are dealing with patients in private practice, it seems wise to use all the weapons at our disposal and not to abandon methods which have worked well in the past.

I am unable to answer the question as to which preparation is the best to use. All act well at times; but in my opinion the beneficial results depend more on the type of infection we are treating than on the brand of drug we may employ.

Summary.

I have tried to show that chemotherapy is an invaluable aid in the treatment of gonorrhœa in men. It apparently reduces the infectious period, lessens the severity of the subjective symptoms and shortens the course of the disease. However, it necessitates more careful tests of cure for these very reasons. Owing to its ease of application by the public it is likely to be abused. It is a valuable help to the general practitioner, who after all sees most of the acute cases.

The use of chemotherapy may lead to an increase in the formation of strictures and in the number of patients suffering from toxæmic conditions. Its use will probably also be responsible for the presence of more "carriers" in the community, for we all know that "out of sight is out of mind". Its use has already altered some of the characteristic features of gonorrhœa—for example, the incubation period.

What will lead to the ultimate wiping out of gonorrhœa? Not chemotherapy in its present form, but only the better recognition by the medical profession of the many curious ramifications of this most prevalent disease. Gonorrhœa is not spread by patients who are in the acute stages of the disease. They only become a danger to the community when they think they are cured.

X RAYS IN THE TREATMENT OF GAS GANGRENE.

By W. H. GODBY,

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It is difficult to arrive at any definite conclusion as to the mortality of gas gangrene when treated by methods used during the last war. These methods are outlined by Colonel C. G. Shaw in an article on "The Treatment of War Wounds", which appeared in THE MEDICAL JOURNAL OF AUSTRALIA on November 4, 1939.[1]

In an article on X rays in the treatment of gas gangrene, published in *Radiology* in January, 1936,[2] J. F. Kelly quoted certain mortality statistics. In one series of 607 cases in civil practice the mortality rate was 49·7%. In an unstated number of cases in the American Expeditionary Force the percentage was 48·52. In another small series of 17 cases the percentage was 20. H. Searby[3] in the *Royal Melbourne Hospital Clinical Reports* for June, 1938, gives a mortality rate of

40%. Soon after this Craig,[4] of Launceston, published a report of a series of patients treated with massive doses of serum in which the mortality was greatly reduced. My own experience gained in over twelve months' service in a casualty clearing station in France is that if the small superficial lesions which were treated promptly by excision are included, the American figures are on the low side.

The first mention that came to my notice of the treatment of gas gangrene by X rays was a preliminary report by J. F. Kelly, published in *Radiology* in 1933.[5] This was followed by a much more exhaustive article in the same journal in January, 1936.[2] Further articles by Kelly and several collaborators were published in *Radiology* in November, 1938,[6] and in *Archives of Physical Therapy* in February, 1939.[7] Since 1933 I have seen *précis* of articles by many other workers in journals to which I have no access.

The treatment recommended by Kelly can be carried out with a mobile X ray unit. The present machines are quite suitable for treatment in infections of the extremities. Larger mobile machines have been evolved in the United States of America for the heavier work of treating infections in the trunk. The factors recommended are 90 to 100 kilovolts on the extremities and 130 to 160 kilovolts on the trunk. About 100 *r* units are given per field per dose, one millimetre of aluminium filtration being used for the extremities and heavier filtration for the trunk. Not more than six treatments should be necessary, given twice daily for three days. A sufficient number of fields should be used to cover completely the area involved. It may occasionally be necessary to give 50 *r* daily for a few more days.

Kelly's last articles are summaries of the collected cases of over 100 practitioners. These have been tabulated and considered under various headings.

TABLE I.

Mortality Reduction by X Ray Therapy in Gas, Diabetic and Arteriosclerotic Gangrene. (After *Kelly.*)

Ordinary Gas Gangrene.	Total Cases.	Living.	Dead.	Percentage Dead.
Extremity	105	99	6	5·6
Trunk	18	14	4	8·1
Diabetic and arteriosclerotic gangrene ..	9	4	5	55·5
	132	117	15	11·3

Four patients with infections of the trunk are included among the ten patients who died of uncomplicated gas gangrene. In each case investigation showed that inadequate treatment had been given, that is, that the full extent of the lesion had not been irradiated, that the voltage had not been sufficient adequately to penetrate the part, or that the time interval between treatments had been too long.

Of the six patients who died of infections of the extremities, four had received inadequate dosage. The other two died within twenty-four hours of admission to hospital.

The death rate among the amputation cases deserves close scrutiny. In Table II necessary amputations are those performed because of mutilation of the limb. Some of these amputations were performed before and some after irradiation. Therapeutic amputations are those performed because of gas gangrene and not because of the severity of the injury.

TABLE II.

Comparative Death Rate in Amputation and Non-Amputated but Irradiated Cases in Ordinary Gas Gangrene. (After *Kelly.*)

Total Number of Extremity Cases.	Amputations.	Dead.	No Amputations.	Dead.	Percentage of Deaths.
105	33	3	—	—	9·1
	—	—	72	—	4·0
Necessary amputation	16	1	—	—	6·2
Therapeutic amputation	17	2	—	—	11·7

At first sight it would seem that the percentage of 9·1 in the amputation cases is not high when compared with 4% in the cases without amputation, since the patients who had undergone amputation would be more seriously injured. Further dissection of this group into necessary and therapeutic amputations, however, is distinctly against amputation as a therapeutic measure.

The same conservative attitude would seem to be correct as regards *débridement*. A wound must be cleared of all foreign material and dead tissue; but wide removal of tissue does not appear to be necessary. In Kelly's series 14 out of 18 patients with wounds of the trunk recovered without *débridement*.

Kelly's last dissection is to determine the effect of serum in gas gangrene.

TABLE III.

Effect of Serum in Gas Gangrene. (After *Kelly.*)

	Number.	Serum.	No Serum.	Dead.	Percentage Dead.
Cases of Ordinary Gas gangrene of trunk and extremities	123	105	—	9	7·1
		—	18	1	5·5

This result bears out Searby's[3] findings that the death rate was higher when serum was used. In none of Kelly's articles is there any mention of the amount of serum used. Had serum been used in the heroic doses recommended by Craig[4] the result would probably have been different.

Since Kelly's articles were published all patients with wound infection under suspicion of gas gangrene admitted to the Perth Hospital have been seen by me and have received X ray therapy according to Kelly's technique, except that 80 kilovolts have been used. The X ray machine used is a Watson-Caldwell mobile unit.

During the past two years five cases have been seen by me in which a provisional diagnosis of gas gangrene had been made. These patients all received appropriate local and general treatment as well as X ray therapy.

The first patient treated was a miner, who had sustained a compound fracture of the lower end of the left femur. The fracture involved the knee joint. He was admitted to hospital on July 9, 1938, four days after the accident, in very poor condition, having come by aeroplane from Onslow, a distance of over 800 miles. The wound was filthy. Inspection of both the wound and the surrounding tissues revealed definite gas gangrene infection. X ray therapy was commenced at once. Serum and "Prontosil" were also given. On account of the splint, the popliteal space could not be irradiated. This omission probably had a great influence on subsequent events. After three days the wound was still filthy, so treatment was given once daily for four more days. The general condition of the patient was so bad that only very limited local treatment could be given on his admission to hospital. Twelve days after his admission his general condition had improved sufficiently to allow of a proper surgical toilet to the wound and of the provision of adequate drainage. During this twelve-day period the tendency of the infection to spread had been checked. At the time of operation the infection was confined to the wound area only. A gradual but definite improvement now took place; but on August 6, 1938, a brisk secondary hæmorrhage from the popliteal artery necessitated amputation of the limb. Further improvement was slow but uneventful.

The second patient was admitted to hospital *in extremis*, with a fulminating gas gangrene infection of a compound fracture of the right leg sustained some days before. The infection involved the whole leg and had extended well above the middle of the thigh. X ray therapy was commenced immediately after a very complete surgical toilet of the wound and free incision of the infected area. On the second day after operation treatment was discontinued as the patient was moribund. Death occurred a few hours later.

The third patient was a boy, who three days before had sustained a through-and-through pea rifle wound in his left thigh. The thigh showed evidence of gas gangrene infection. He was operated upon at once and a thorough surgical toilet was performed. Four days later X ray therapy was asked for, as the infection had spread up to Poupart's ligament and into the buttock in spite of active local treatment and the use of large doses of serum and "Prontosil". In this case the response to X ray treatment was most dramatic, a definite general improvement being noticed within twelve hours. Pain had been severe; but this also immediately decreased. The patient's subsequent convalescence was uneventful.

The fourth patient was admitted to hospital at night, with a punctured wound of the right shin received two days before. The region of the wound was brawny. The wound itself was gaping and contained a dark slough. Slight crepitus was felt in the area encircling the wound. The practitioner attending the patient stated that he had expressed gas bubbles from the wound earlier in the evening. Examination by artificial light was inconclusive, but X ray therapy was commenced as a precautionary measure, one treatment being given that night and a second next morning. Films taken the day after the patient's admission to hospital failed to reveal the presence of gas in the area under suspicion, and X ray therapy was discontinued.

The fifth patient had been injured in a motor car accident. The left leg was amputated below the knee soon after his admission to hospital. There was also a comminuted fracture of the right leg. This was not compound, but severe abrasions were present about the level of the fracture. About two days later this leg became extremely painful and a brawny, discoloured swelling developed. It was thought that some emphysematous crepitus was detected; but films taken showed no evidence of gaseous invasion of the tissues. In spite of the lack of positive evidence of gas gangrene, X ray therapy was given, as there was no doubt of the virulence of the infection. The patient was an elderly man, and his condition was not good. In this case, again, the symptoms subsided rapidly after X ray therapy was commenced, the relief from pain being very noticeable.

The first three cases were undoubtedly gas gangrene infections. The fourth case was doubtful; but it is possible that the infection was aborted. The fifth case I do not regard as one of gas gangrene, but it is included to show that X ray therapy is of use in the treatment of other infections.

All these patients except the fourth were recommended for X ray therapy when the infection had been present for some days. In the first three cases X ray therapy was looked upon as a last resort. On active service such delay in receiving the patients is unlikely, since in a very short time all medical officers would become expert in the early diagnosis of the infection. Because of these two factors treatment would be commenced earlier. Even better results should be anticipated as a consequence.

When these cases are reviewed, it is seen that they bear out most of Kelly's contentions. In the first case, had an amputation been performed at any time during the first week the patient would have died. Proper *débridement* had to be delayed for twelve days. In spite of this the gas gangrene was checked, and when finally operation had to be performed it was done through a comparatively clean area. The second patient did not appear to recover from the added shock of the extensive surgical toilet. It is probable that massive doses of serum and X rays might have saved him. In the third case amputation would certainly have been performed in the early days of the last war, and the result would have been fatal. In this case X ray therapy caused immediate improvement after the administration of serum and "Prontosil" had failed to check the spread of the infection.

What was originally intended to be a short communication has developed into a long and discursive article, which I feel and hope will be provocative. It is a résumé of other men's work; but I do not apologize except to Dr. Kelly for having quoted so freely. This work is not new; Dr. Kelly's first patients were treated in 1928, but even now his work appears to be almost unknown outside the American continent. There may have been other references, but I have seen only one in a British publication, and none in an Australian publication.

Gas gangrene will be seen in this war. Are we to rely on the old methods of treatment when we have in our hands what I am convinced is an enormous improvement on any method of treatment yet suggested? It will be said that the cost is high. If serum is used in the heroic doses that appear to be necessary,[4] the cost will be higher, and the supply of serum possibly inadequate. Even if the cost of each unit were £500, its cost to the nation would be saved if one amputation were made unnecessary.

The vast majority of treatment would have to be given in the forward areas in casualty clearing stations or similar hospitals. In these enlightened days all these hospitals will be lit by electricity. I have enough faith in our electrical engineers to be sure they will be able to evolve a machine capable of delivering the requisite number of *r* units at an adequate kilovoltage.

Acknowledgements.

I must express my gratitude to the in-patient surgical, resident and nursing staffs of the Perth Hospital. Without the earnest cooperation of all concerned it would have been impossible to carry out the treatment. My special thanks go to the technicians of the radiological department, who carried out the treatment indicated with meticulous care.

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Addendum.

Since this article was written I have been informed that very great interest in Dr. Kelly's work on the X ray treatment of infections is being shown in the United States of America. To allow of his methods being carried out in full, a special mobile therapy machine has been made. This machine is now obtainable in Australia.

Reviews.

THE SECRET OF LIFE.

"THE SECRET OF LIFE", by M. Georges Lakhovsky, is a suggestive and interesting attempt to break down the barriers between the physical and the biological.[1] Modern physics has substituted for solid matter a tenuous spirituality composed of wandering electrons and whiffs of radiation. The impalpables, electric force and radiation, have together become the equivalent of palpable substance. Science has revealed a "grand orchestra" of vibrations in the ether, intimately associated with the structure of matter ranging from the broadcasting band, so familiar, to the infinitesimally small wave-lengths of cosmic radiation, which arrive at this planet from outer space. The importance of these vibrations, collectively known as radiation, has emerged only during this century, and even yet we only stand on the threshold of the most fascinating and unpredictable discoveries.

Therapeutically we are familiar more or less with infra-red rays, ultra-violet rays, X rays and γ rays; intellectually we have vaguely heard reverberations as to the significance of cosmic radiation; but so far this new and shining weapon of science has not been applied to elucidate the secret of life itself. It is to this task that M. Lakhovsky applies himself in this book.

When an engineer turns seriously to biological problems unorthodox and stimulating theories may be expected. To the orthodox biologist, or to the practising physician who is practically a biologist in human values, such theories may seem amateur hobby-horse heresies, fit only to be scorned and cast aside. Yet it is exactly at the border-line between two such water-tight compartments as physics and biology that knowledge awaits us, and in the present state of specialist education the discoverer, if discoverer there is to be, must almost certainly be an amateur from one or the other aspect. The genesis of such hybrid research, begotten of biology by a physicist, is, of course, no guarantee of its worth; but at least it may be esteemed as a praiseworthy thrusting forth into the unknown, and as such deserves our tolerance and commendation.

Broadly speaking, M. Lakhovsky considers that all living matter emits radiation and receives radiation. Such diverse phenomena as the homing instinct of pigeons, the migration of animals, the variable growth of plants, the microbic infections of man and the origin of cancer are woven into a theory of life which is original in conception and startling in its resultant conclusions. When we lay down the book, however, we feel that the case is not proven. We should like to believe such a satisfying hypothesis, which is inherently possible and which would explain so many baffling things. M. Lakhovsky has only demonstrated that his theory is conceivable in the structure of the universe, and has brought forward suggestive data which should serve as an incentive to further research. Much experimental work, however, is necessary to give it the status of a competent working hypothesis. And then—who knows?

> There are more things in heaven and earth, Horatio,
> Than are dreamt of in your philosophy.

[1] "The Secret of Life. Cosmic Rays and Radiations of Living Beings", by G. Lakhovsky, translated from the French by M. Clement; 1939. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 209, with illustrations. Price: 10s. 6d. net.

THE PROBLEM OF OTOSCLEROSIS.

OF the numerous theories attempting to explain the cause of otosclerosis, heredity has long been accepted as one of the more important. Professor Louis K. Guggenheim has now published a monograph entitled "Otosclerosis".[1] In this he presents evidence to support the thesis that, beyond the recognized transmission of the tendency to otosclerosis through many human generations, the explanation goes back through the ages and may be traced in the study of phylogenesis, so that in various forms of earlier animal development long before man, the form of structure of the primitive labyrinthine framework is found to bear comparison with that which is produced in man as a result of the development of the commonly recognized bony changes of otosclerosis. A large section of the work is devoted to studies, both by the author and by other authorities, of human ontogenesis, and comparison is made between the earlier stages in embryonic development and the arrangement observable in more primitive forms of animal life. A final section deals with the study of the pathogenesis of otosclerosis in the human subject. Putting these various observations together, the author expounds the theory that otosclerosis represents an atavistic regression, due possibly to the persistence in susceptible individuals of genes representative of the form of development of the labyrinthine framework to be found in more primitive animals.

This book contains a lucid explanation of an attractive theory of this very difficult but serious human problem. As the author himself acknowledges in conclusion, it represents a philosophico-scientific contribution to the otosclerosis problem. A feature of the work is its numerous beautifully reproduced photomicrographs, which, even if the theory is at present more philosophical than purely scientific, are of permanent worth in recording the study which has been given to this problem by the author.

The book is well worth reading by all who give thought to this question, and a copy of the monograph might well be incorporated in every institutional library.

[1] "Otosclerosis", by L. K. Guggenheim, M.D., F.A.C.S.; 1935. St. Louis: Published by the author. Imperial 8vo, pp. 222, with illustrations.

The Medical Journal of Australia

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PATHOLOGICAL ANATOMY.

THE scope of the science of pathology could not be more accurately defined than in the terms of the title of Morgagni's classic work, *"De Sedibus et Causis Morborum"*. By the publication, at the age of eighty years, of his observations concerning the seats and causes of diseases, made during his long tenure of the chair of anatomy, and based on the dissection and study of structures as modified by disease, the sage of Padua laid the foundation of the science of pathological anatomy. The study of morbid anatomy has ever since been properly regarded as a means towards improvement in the practice of medicine; but with the birth of bacteriological science in the latter half of last century and the intensive application of biochemical principles to the elucidation of the problems of disease in our own times, these "fresh woods, and pastures new" have appeal to the imagination of research workers at the expense of morbid anatomy. Hence the new pathology, extolled as the pathology of the living, in which test-tube dogmatism has for many proved more attractive than teaching based on the study, by dissection and microscopy, of the changes wrought by disease in the bodily organs and tissues. Morbid physiology and morbid anatomy should wait each upon the other to advance a balanced science of pathology, and it would appear to be labouring a truism to insist on the importance of morbid anatomy. Nevertheless, some such recall to the essential and fundamental in gaining true concepts of disease is rendered necessary by the fact that so many medical men exhibit no further interest in the anatomical expression of disease once the compulsion inherent in examinations is lifted. That so many graduates readily take advantage of their emancipation from obligatory concern with morbid anatomy may be due in part to the fact that the crowded curriculum of the medical school has forced them to gain most of their knowledge of the subject from books rather than from demonstrations in the *post mortem* room. Not even the most gifted powers of verbal description can replace well-executed macroscopic and microscopic preparations of pathological specimens; but in the past text-books on pathological anatomy have been proverbially dull. Until the advent of William Boyd no writer of our knowledge ever attempted to infuse a treatise on pathology with a literary quality. A light touch here and there, an occasional apt quotation, graceful writing at all times, and lucid expositions of the relation of symptoms to lesions, combine, in the hands of William Boyd, to transform the text-book of pathology from a lifeless catalogue of facts into an eminently readable volume.

Medical men who are fortunate enough to retain a close association with the centres of teaching, as do the majority of those who gain appointment to the staffs of metropolitan hospitals, are favourably situated with respect to the completion of the case records of their patients which autopsies provide, the confirmation of diagnosis or revelation of error. It is to be doubted, however, if full advantage is taken of the routine autopsy work of the hospital. Too often the physician or surgeon in charge of the deceased patient is content with a tabulation

of the *post mortem* findings, and the time-honoured practice of conducting the clinical class to the *post mortem* room, there to review the course of the patient's illness in the light of the autopsy findings, has largely fallen into abeyance.

Those who are unable to maintain close contact with the clinical schools and who bear the heat and burden of the day in exacting general practice, have much to gain from periodic visits to that integral component of university and hospital departments of pathology alike, the pathological museum. Men who have spent sufficient years in practice to have passed the meridian, and who probably have painful examination memories of decolorized pathological specimens, the identification of which was largely a matter of guesswork, would find it instructive and agreeably surprising to explore a well-appointed pathological museum. There should be found specimens with all natural colour preserved, clearly dissected, effectively mounted, and classified on a rational basis. The system of indexing should enable the interested visitor or post-graduate student to locate specimens relating to individual patients, or to assemble a group of specimens illustrative of a particular pathological condition, to consult summaries of the clinical facts concerning the specimens in which he is interested, and to find microscopic sections prepared from them.

Many a valuable specimen, the full story concerning which would be found absorbingly interesting, rests in undisturbed retirement in the seclusion of a pathological museum, "unhonoured, and unsung", its presence known probably only to the pathologist in charge and his technical assistant.

There will probably be found none to dispute the importance of a sustained study of morbid anatomy; it is after all but "The Importance of Being Earnest", if we may adapt the title of Oscar Wilde's brilliant play to our purpose. There is reason to fear, however, that much of the tribute paid to pathology in general, and morbid anatomy in particular, is mere lip service. Were it otherwise, the status and emoluments of pathologists would have been improved long ago, and pathology would not be so frequently described as the Cinderella of the specialties in medical practice. *Post mortem* work may on occasions be distasteful, even to the most inured pathologist; but it is doubtful if he finds it more disagreeable than the worn-out witticisms and threadbare jests which he sustains *ad nauseam*, poor attempts at humour, which seek to remind him that he is but a denizen of the dead-house or an underling of Charon. In practice, the work of few, if any, pathologists is limited to the conduct of autopsies. When the opinion of the microscopist is sought on a critical piece of biopsy tissue he is surely entitled to the same standing as a consultant specialist in medicine or surgery.

Despite the fact that morbid anatomy has been partially eclipsed by the rapid headway made by other branches of pathology, it has always been, and must remain, the corner-stone of the edifice of clinical medicine. The anatomy of disease alone can explain the majority of those physical signs, proficiency in the detection and evaluation of which makes a diagnostician. The clinician who thinks in terms of the structural changes induced by disease will know the physical signs to be anticipated and where to search for them. They who seek first a knowledge of morbid anatomy shall have all things clinical added unto them. Not the least of these is a saving scepticism, from which derive a balanced and critical outlook, and the quality of stability as against a weather-vane responsiveness to every gust of new-fangled theory. Flowing periods and studied rhetoric could not express this fundamental truth more effectively than Morgagni's simple statement in the *"De Sedibus"*: "Those who have dissected many bodies have at least learned to doubt; when others, who are ignorant of anatomy, and do not take the trouble to attend to it, are in no doubt at all."

Current Comment.

THE INFLUENCE OF EMOTIONAL FACTORS UPON HEALTH.

THE emotional factor in disease has been the subject of much writing and talking, but even yet it

has not perhaps assumed its just place. Now war is again upon us and we must think seriously of all its attendant injuries to body and mind, to say nothing of soul, if the physiologists will allow us such a reference. In the past certain war neuroses have been given unfortunate names, such as "shell-shock" or "disordered action of the heart", which have tended to suggest quite an incorrect view of their true nature, and civilian practice abounds with examples of the same kind. Frank Fremont-Smith, in writing on the influence of emotional factors upon physiological and pathological processes, asks whether in the swiftness of our advance in science we may not have lost something of the wisdom of the past.[1] He quotes Peabody as saying: "What is spoken of as a 'clinical picture' is not just a photograph of a man sick in bed, it is an impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes and fears." Perhaps we might lay some stress on fears, those demons whose chilly fingers stimulate or inhibit our metabolic machines more than we individually realize. Their presence within may be guessed by the doctor of experience, particularly if he understands, as Anita Mühl recently wrote in this journal, that "only too often the people with real emotional problems seem outwardly calm, well poised and well balanced".

This writer in her article pointedly stated that none of the patients referred to in the case histories she quoted were considered "neurotic". She further emphasized that both branches of the autonomic nervous system, the sympathetic and parasympathetic, were concerned in the visceral changes brought about by nervous influences. It is curious that van Noorden called attention to a "vagus neurosis" as early as 1892; for the chemical researches on adrenaline gave a star role to the sympathetic nervous mechanism, which should have been shared by its neuro-chemical partner. The importance of both these antagonized and not always well-balanced factors is brought out strongly by Fremont-Smith. He reminds us that recent physiological research has proved that acetylcholine as well as adrenaline is present in the blood of laboratory animals during fear, and points out also that blushing, crying, fainting, vomiting, or disturbance of the organic reflexes, cannot be explained on the basis of sympathetic stimulation alone. Fremont-Smith summarizes the modern views on the hypothalamus, particularly with regard to the various autonomic nuclear groups. This knowledge is now in the realm of elementary physiology and perhaps an understanding of the extraordinarily diverse results obtained by stimulation of the various centres involved has bewildered clinicians, who may think that it must be a pure matter of chance which special effect is produced. Fremont-Smith draws attention to the necessity of remembering the end-organ of reception as well as the stimulating neuronic mechanism. He remarks that as all the tissues concerned share in this stimulation it must follow that a diseased organ must be subject to the same influence. Thus the sensitive thyreoid, for example, in certain patients whose endocrine or nervous system belongs to a certain pattern, or whose thyreoid gland is actually anatomically and functionally abnormal, may be over-responsive to sympathetic stimulation, whether direct or indirect, and the familiar thyreotoxic syndrome result. Migraine and asthma offer other familiar examples.

But our thoughts must not be directed only to the somatic tissues, the chemical mediators and the hypothalamic centres. There is the cerebral cortex also for consideration, that neopallial combined curse and blessing, which seems at present to be organizing a strangely unbiological destruction for at least part of the race of man. Where the hypothalamus integrates it seems as if the cortex regulates; for there is representation of both sympathetic and parasympathetic function in the higher cortex. Thus, as Fremont-Smith well puts it, the organism may be prepared for instant and violent action yet maintain relative constancy of internal environment, an Hibernian yet intelligible expression that is difficult to paraphrase. It will now be evident that to form a true and adequate concept of psychosomatic disease it is necessary to take all these factors into consideration, and to realize that the symptoms in any given case will depend not only upon the physiological and biochemical results of emotional stress but also upon the degree of reactivity of the organs and tissues concerned. These last factors may in turn be altered by heredity, environmental factors or actual anatomical or pathological trauma. When we bring our theorizing into actual contact with the patient we need all our judgement and balance. Doctors often inquire about possible anxiety factors and are met by an apparently frank denial. The patient may not want to tell; but not infrequently he has so effaced the connecting link in his mind that he has forgotten it. As Fremont-Smith remarks, forgetting is not just an absence of remembering, but an active process. Therefore a direct question-answer technique will often fail. It is only by a close study of the history and the patient from all angles that a possible nexus between the internal and the external disharmonies can be established. Sometimes only the expert will succeed; but it is not only the trained psychiatrist that has to deal with these problems. Some of them cannot be solved; as the author says, for the problems of human unhappiness, bereavement, insecurity and despair civilization often has no adequate answer. Yet we should remember that diseased organs are not immune to the further inroads of physiological and biochemical conflict, and also, in dealing with individual patients, that the most significant conflicts are often those which the patients have forgotten.

[1] *Bulletin of the New York Academy of Medicine*, August, 1939.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

Innervation of the Ciliary Muscle.

J. M. D. OLMSTED AND M. W. MORGAN (*The American Journal of Physiology*, October, 1939) review the arguments in favour of a dual autonomic nervous control of the ciliary muscle, as against parasympathetic control only. Six dark-eyed rabbits, accustomed to being handled, were chosen at random and their visual acuity was tested under different conditions. The rabbit's eye in the unexcited state was found to be more hypermetropic than man's eye at rest. Excitement caused increase in hypermetropia concurrently with dilatation of the pupil. Return of the lens to the normal resting condition proceeded concurrently with the course of constriction of the pupil to the diameter of the unexcited state. The same procedure was followed after instillation of a few drops of 2% homatropine solution into the eye to paralyse the parasympathetic nerve endings. Within half an hour there was no response of the pupil to light, and it was then found that the unexcited rabbits' eyes were even more hypermetropic than before, the average increase (48 readings) being almost exactly 0·5 diopter for each eye. Excitement still further increased this hypermetropia. The authors consider that this is evidence of sympathetic innervation of the ciliary muscle.

The Secretion of Bile.

CHARLES ZUCKERMAN, BENJAMIN KOGUT AND MENDEL JACOBI (*The American Journal of Digestive Diseases*, May, 1939) record observations on the rate and quantity of biliary secretion. The subject of their experiments was a female patient, aged twenty-five years, who had been admitted to hospital with a history of progressively increasing jaundice accompanied by diarrhœa and the passage of clay-coloured stools. The patient had had a cholecystectomy performed some months before. Exploratory laparotomy showed a complete stenosis of the distal portion of the supraduodenal segment of the common bile duct. An attempt to "bridge across" the common bile duct and duodenum with a *T* tube was unsuccessful; at no time after the second operation was any bile found in the intestinal tract. After the removal of the *T* tube all the bile secreted was collected from the abdominal fistula. The patient recovered from the operation and was discharged from hospital, having been taught to collect her own bile and drink it with each meal. Later she was readmitted to hospital for observation. Liver function tests, blood count and estimation of the commoner chemical constituents of the blood, failed to reveal any abnormality. The patient was given a gradually diminishing diet with a constant fluid intake until she became accustomed to starvation without discomfort. She was then deprived of food on three different test days, with intervening days during which a normal diet was administered. Varying quantities of water were allowed on the starvation test days. None of the collected bile was readministered to the patient. The authors' observations, made when the subject was starved, were as follows. The hourly rate of flow during the day and night was found to be fairly regular. There was, however, a six-hour interval during the night and early morning during which there was an appreciable diminution of flow. The administration of varying quantities of water had no effect on the rate of secretion. The daily total output averaged between 468·1 cubic centimetres and 500·9 cubic centimetres, or between 10·5 and 11·0 cubic centimetres per kilogram of body weight. The authors point out that these values do not take into consideration the effects of intestinal bile as a secretory stimulant, bile having been excluded from the patient's economy during these studies.

Action of Progesterone.

ALEXANDER LIPSCHÜTZ, RUPERTO MURILLO AND LUIS VARGAS (*The Lancet*, August 19, 1939) record a series of experiments concerned with the action of progesterone. Five castrated female guinea-pigs received subcutaneous injections of 80 microgrammes of œstradiol (the benzoic ester in olive oil) three times a week. Two of these animals were treated for 47 days and three for 90 days. *Post mortem* examination of all the animals revealed uterine or extrauterine tumours. In a second experiment five castrated female guinea-pigs were treated in the same way and with similar quantities of the benzoic ester of œstradiol. After 30 days three subcutaneous injections of 12 milligrammes of progesterone in olive oil were given weekly in addition to the 80 microgrammes of œstradiol. Two animals were killed after 47 days and three after 90 days. Only one animal (treated for 47 days) developed uterine tumours; there were no tumours, uterine or extrauterine, in the four others. The authors comment that their experiments, though few, suggest that progesterone exerts an "antitumorigenic" action. They state that their results support the belief that the development of uterine fibromyomata in women is due to a disturbance of the normal balance between follicular and luteal hormones and that progesterone may prove useful as a therapeutic agent in the treatment of fibromyoma.

The Pituitary Gland and Water Diuresis.

ARTHUR M. WALKER (*The American Journal of Physiology*, October, 1939) has attempted to demonstrate the presence of an antidiuretic substance of pituitary origin in body fluids. The theory of a control over the volume of urine by the posterior lobe of the pituitary gland is widely adopted as an explanation of variations in the excretion of water which occur under a variety of circumstances—water diuresis, diuresis from hypnotic suggestion, conditioned reflex or prolonged rest, oliguria from exercise, anæsthesia, afferent nerve stimulation, acetylcholine injection *et cetera*. This theory postulates that under normal conditions the reabsorption of water in the kidney is subject to constant stimulation by the antidiuretic hormone, the degree of which is proportional to its concentration in the blood. The author points out that it should be possible to demonstrate this antidiuretic substance in concentrations that vary inversely to the degree of hydration of the animal. He has investigated water diuresis, making an assay of the antidiuretic potency of specimens of blood, cerebro-spinal fluid and urine, collected before and after the oral administration of water. A method for the separation of the antidiuretic fraction of pituitrin from the other constituents of cerebro-spinal fluid and urine is described. The author's experiments failed to disclose definite support for the pituitary theory of water diuresis. Moreover, he showed that cats and rats, whose pituitary glands had been removed, continued to respond to water ingestion by diuresis and to water deprivation by oliguria, in the same way as before operation.

Alterations in Dark Adaptation under Reduced Oxygen Tension.

ROSS A. MCFARLAND AND JOHN N. EVANS (*The American Journal of Physiology*, August 1, 1939) have studied the "dark adaptation" of 20 human subjects under conditions of low oxygen tension, such as occur at high altitudes. Pilots have frequently reported a general darkening of the visual field while flying at great heights without using oxygen apparatus. The authors have measured this darkening of the visual field under anoxia by the usual procedures of studying night blindness, that is, the measurement of the return of the capacity to see in the dark after exposure to a light of high intensity. The thresholds of light sensitivity were measured with a "biophotometer". In this apparatus the source of the light adaptation is a rectangular ground-glass screen, measuring 10 by 13 centimetres, centrally fixed about 32 centimetres from the subject's eyes. This screen was illuminated by a 100-watt lamp. The amount of current was controlled by a rheostat and voltmeter, so that the brightness of the screen was 100 millilamberts (106 foot-candles as measured by a Macbeth illuminometer). The effect of oxygen deprivation on light sensitivity was observed for twenty minutes after exposure for three minutes to a light of 100 millilamberts. Each subject was tested at a simulated altitude of 7,400 feet (15·8%

of oxygen), 11,000 feet (13·7% of oxygen) and 15,000 feet (11·7% of oxygen). The dark adaptation curves (threshold plotted against time) were progressively elevated as oxygen deprivation increased. These effects were counteracted within two or three minutes by the inhalation of oxygen. The diminution in light sensitivity was statistically significant for all but five of the eighteen subjects at an oxygen tension of 15·8% (7,400 feet), for all but one at a tension of 13·7% (11,000 feet) and for the entire group at a tension of 11·7% (15,000 feet). For the subjects studied under the conditions of these experiments thresholds relating to dark adaptation provide a sensitive test for showing the initial effects of anoxia at partial pressures of oxygen where other sensory tests have failed to show reliable changes. In the authors' opinion these effects are probably of no great practical significance in relation to night blindness in a pilot until altitudes of approximately 10,000 to 12,000 feet are attained.

BIOLOGICAL CHEMISTRY.

Creatinin Excretion as a Standard of Basal Metabolism.

N. B. TALBOT, JANE WORCESTER AND ANN STEWART (*American Journal of Diseases of Children*, September, 1939) have investigated the relationship between creatinin excretion and basal energy metabolism. The validity of creatinin output as a standard of basal metabolism is confirmed by statistical methods, the standard is formulated and a test application of it is described.

Thyreoid and Vitamin B_1.

R. A. PETERS AND R. J. ROSSITER (*The Biochemical Journal*, July, 1939) have observed that in rats with experimental hyperthyreoidism produced by the administration of thyroxine or desiccated thyreoid a genuine vitamin B_1 deficiency is produced in the tissues. Subcutaneous injections of vitamin B_1 prevented the loss of weight normally resulting from injections of thyroxine. Previous treatment with vitamin B_1 also lessened the rate of decrease in weight when the rats were fed with thyreoid tissue. Catatorulin effects (indicative of vitamin B_1 deficiency) were obtained in tests of brain tissue from animals suffering from hyperthyreoidism, but not in tests of brain tissue from normal animals on the same diet. The cocarboxylase content of tissue extracts from hyperthyreoidic animals was intermediate in value between those from normal animals and those from animals with symptoms of vitamin B_1 deficiency. When seven days' treatment with vitamin B_1 was given the cocarboxylase content of the tissues fell more rapidly in hyperthyreoidic than in normal animals. It was evident that the administration of thyreoid substance or thyroxine to rats changed their normal requirement for vitamin B_1 in that larger amounts were needed for the maintenance of proper tissue levels of this vitamin.

Potassium Metabolism.

M. JOSEPH, W. E. COHEN AND D. M. GREENBERG (*The Journal of Biological Chemistry*, June, 1939) have used radio-active potassium in a study of the absorption from the gastro-intestinal tract, the rate of excretion in the urine and the distribution in certain tissues of potassium administered as potassium chloride to fasting rats. The potassium was largely absorbed from the gastro-intestinal contents within half an hour. The degree of accumulation of potassium in the tissues of the small intestine and stomach suggested that absorption occurred mainly from the small intestine and but little from the stomach. Examination of liver tissue showed an intake of potassium which followed the absorption curve very closely both in rise and in fall. The deposition in the liver was only transitory and appeared to be incidental to its location in the path of the portal venous system. The intake of potassium by skeletal muscle was slow and increased continuously for at least four hours and remained at a constant rate for twenty-two hours. After four hours the concentration of radio-active potassium in muscle was less than half the concentration in the blood. The constant rate of increase of radio-active potassium in the muscle indicated the essential participation of potassium in muscle metabolism. Excretion of radio-active potassium through the kidney took place at a moderate and nearly constant rate of 6% to 7% per day.

Formation of Conjugated Glycuronic Acids.

W. L. LIPSCHITZ AND E. BUEDING (*The Journal of Biological Chemistry*, July, 1939) have reported the results of experiments on the formation of conjugated glycuronic acids from *d*-borneol, *l*-menthol, "Avertin" and phenol by liver slices of the rabbit, rat and guinea-pig. The process was shown to correspond with that in the living animal. Small amounts of conjugated glycuronic acids were also produced by kidney slices; but other tissues were incapable of producing the acids. The evidence showed that the glycuronic acid was not derived from the oxidation of carbohydrates, glucosides or maltosides, nor was free glycuronic acid conjugated easily with alcohols. The conjugated glycuronic acids were formed as a result of a synthetic process from the shorter carbon chains (three-carbon compounds). The production of glycuronic acids involved an oxidation for which free oxygen was necessary, which was catalysed by heavy metals and which was completely inhibited by prussic acid and depressed by hypnotics. The process also involved an esterization of phosphoric acid as a prerequisite. Liver slices from fasting guinea-pigs produced only small amounts of glycuronic acids, the production being greatly increased *in vitro* by the addition of dihydroxyacetone, pyruvic acid or lactic acid. The synthesis of carbohydrate and the synthesis of conjugated glycuronic acids from compounds with a three-carbon chain were competing processes. In this way a detoxication of the conjugated alcohol was produced.

Hæmoglobin Metabolism in Chronic Infections.

JANET M. VAUGHAN AND M. F. SAIFI (*The Journal of Pathology and Bacteriology*, July, 1939) have studied patients with chronic infections in order to determine the cause of the associated anæmia. It was concluded that some abnormality of hæmoglobin synthesis dependent upon the presence of infection was responsible for the anæmia. Unpublished evidence was cited to show that the bone marrow in such patients was not aplastic, but rather hyperplastic. The experimental data indicated that there was no evidence of increased hæmoglobin breakdown. Plasma bilirubin was normal in all cases. Urobilinogen excretion was rarely increased above normal, and where slight increases were observed there was no increased regenerative activity, as occurs in known hæmolytic anæmias. It is believed that although urobilinogen excretion may bear no exact quantitative relation to hæmoglobin breakdown, any increase in hæmoglobin breakdown is accompanied by increased urobilinogen excretion. Observations on porphyrin excretion showed increased excretion of coproporphyrin I and coproporphyrin III, suggesting a disturbance of hæmoglobin synthesis or degradation.

Growth Hormone.

J. FREUD, L. H. LEVIE AND D. B. KROON (*The Journal of Endocrinology*, June, 1939) have shown in experiments on rats that after hypophysectomy longitudinal bone growth ceases, especially in the tail. Seven days after operation the difference between rats that had been operated on and control animals was readily detected in skiagrams. Epiphyseal closure occurred soon after operation and, once completed, could not be reversed by treatment with growth hormone. When treatment with growth hormone (a pituitary extract) was commenced immediately after hypophysectomy, epiphyseal closure was prevented and normal longitudinal growth occurred. The growth defect after operation was localized in the growing epiphyseal cartilage, and while there was no abnormality in the development of bone tissue, such bones as the cranial bones developed normally. The histological features of the process of growth cessation after hypophysectomy were exactly analogous to those exhibited at the end of the normal growth period.

Special Articles on War Medicine and Surgery.

I.

THE MANAGEMENT OF NEUROTIC AFFECTIONS IN MILITARY PRACTICE.

On an occasion the late Sir Neville Howse remarked upon the extent of neurotic disablement among returned soldiers. He said, if I remember aright, that in his estimate three-fourths of all the disablement suffered by ex-soldiers was neurotic. He was referring, of course, particularly to that neurotic embroidery which so commonly adds to compensatable disablement, even when that compensatable disablement is such a clear-cut disability as the loss of a limb by a sound conscientious individual.

I do not intend to discuss how far, if at all, Sir Neville Howse's estimate was an exaggeration. The remark was made by one in a position to judge, and I quote it as a brief means of emphasizing the extent and importance of the problem of handling neurotic affections, both during and after the present war.

The problem is indeed a serious and difficult one. It is with due apology that I attempt to touch upon it in this sketchy paper. I am very appreciative that I have been asked to give what guidance I can from my experience to those of you who will have the honour of caring for the troops in the present conflict. I wish to express indebtedness to my colleagues in the repatriation service and to Dr. W. R. Page, our consultant psychiatrist, for discussions of my notes. At the same time it is to be understood that this paper does not represent any official pronouncement; it comprises my personal views.

I do not intend to confine myself to considerations of what may be described as neuroses or psychoneuroses in the exact sense, but to speak widely of mental abnormalities which may unfit a man for service and which may become compensatable. I propose to read to you my more or less coherent notes under three headings. These are: (i) factors causing the development of neurotic incapacity in soldiers, (ii) the selection of men for war service, (iii) the prevention of neurotic affections and the disposal of neurotic personnel.

Factors Causing the Development of Neurotic Incapacity in Soldiers.

In popular belief, what has been known as shell-shock appears to have prime importance as a cause of neurotic manifestations and of insanity. This popular belief has received a great deal of support from the medical profession, without real justification. There were certainly, during the last war, cases of shell-shock. This was in our experience a transient condition of shock, emotional disturbance, confusion and tremor caused by the blast of explosion, with or without contusions or open wounds. The occurrence of such shock without an actual wound was much less common than some would have us believe. It was perhaps more common in the earlier part of the last war at Gallipoli, on harder ground, with inferior shells. An aftermath of it in the way of neurosis was, however, less common in 1915 than later, because the attitude towards shell-shock was in 1915 more deprecatory. It has been taught that, in some at least of such cases, multiple small hæmorrhages occurred in the central nervous system and provided an organic basis for symptoms which were subsequently labelled as neurotic. It can be taken that some such cases did occur, but one regards them as rarities. The practice of suspecting the existence of such organic lesions in all men, apparently neurotic in later years and giving a history of shell-shock, is unjustified.

The term "shell-shock" came to be applied loosely to all neurotic or hysterical conditions, whatever the true history of onset might be. It is to be noted that most of such functional disorders developed in base hospitals and camps, and not in forward areas. A direct causative relationship between shell-shock and subsequent neurosis is considered not common. When a neurotic aftermath did occur, its causes were generally the character of the individual and the more or less subconscious factors of avoidance, sympathy and gain—to which further reference will be made.

The matter was put in a nutshell by one of our patients at Callan Park Mental Hospital. He was not very bright mentally, and, sending us a letter, he became tangled and wrote: "Of course, everyone knows that the great cause of shell shock is neurasthenia."

The actual onset of insanity in the sense of certifiable insanity among troops in the field was rare. The incidence of insanity among men of the young soldier age is, of course, less than it is in the later years of life. Apart from that reason, experience supports the theoretical conclusion that shock, fright, hardship and exertion are not considerable causes of insanity; nor does one find transfer to strange surroundings, interruption of occupation and habits, and the severance of family ties important causes of mental disorder. On the contrary, discipline and training, release from ordinary responsibilities of life and incorporation into the minor herd of a good army unit are factors not unfavourable to the unstable mentality.

My recollection and opinion in this regard are confirmed by our later experience of the incidence of insanity in soldiers in the years since the last war. The rate of insanity among ex-soldiers now, twenty years later, is not excessive. This statement is made only after careful and protracted inquiry as to the relative incidence of insanity in surviving ex-soldiers and in civilian males of the same age groups. An experience over the past twenty years, which includes examination of practically all ex-soldiers in New South Wales suffering from insanity or major neurotic disorders, convinces me that the essential factor in their disablement is a constitutional psychopathic personality. This conclusion agrees with that reached by those with a similar mature experience in other countries.

As has been said, the incidence of insanity during and since the last war has not been excessive. This cannot be explained by the selection of men for enlistment. Those of you who can recall the somewhat hysterical methods of voluntary recruiting for the last war (methods which, I trust, will not be revived) will realize that a good many of the unstable, defective and vagrant of the community were accepted, though they frequently did not proceed abroad. It is to be remembered, too, that medical examination of men in their third decade does not provide much protection against the chance of their becoming insane in their fourth.

It must be taken, then, that there is no war service factor which particularly influences the occurrence of insanity. Some allowance may be made for a precipitating factor, in the way of the more or less deeply submerged desire to avoid the dangers and unpleasantness of service. This is not of great importance in connexion with insanity; but it is so in connexion with the neurotic affections.

For practical considerations it must be stated emphatically that, in the outcome, the most serious factor, the factor which fixes and perpetuates the neurotic disability, is the factor of compensation—the more or less subconscious desire for gain, sympathy and avoidance of civil responsibility. There is here an important difference between insanity and the neurotic affections. Insanity is not unduly common among ex-soldiers; neurotic disablement is unduly common. This undue prevalence of neurotic disability in ex-soldiers results in the main from the compensation factor. In considering this, we must remember that the compensation factor includes the train of over-examination, over-treatment, discussion of medical matters with claimants and advocates and the mischievous publicity given to mis-

guided beliefs as to the prevalence of various diseases, premature age and early death of ex-soldiers.

To recapitulate, the important factors in causing neurotic disablement in soldiers are: (i) the "constitutional make-up" of the man, (ii) the factor of avoidance, (iii) the factor of compensation.

I have not much more to say on this matter of causation, but I shall refer to certain minor factors, in connexion with their possible prevention, in the third portion of this paper.

I trust that in an endeavour to be brief, I have not appeared dogmatic. I feel that this is not the time for any academic considerations of the origin of psychoneuroses or psychoses. I should like to say, however, that in considering the whole subject I think we should keep in our minds a conception of man as a gregarious fighting animal, in whom the few generations of our civilization have made little essential change.

I would recommend to your attention a small volume by Wilfred Trotter, "Instincts of the Herd in Peace and War". This was published during the last war and becomes again, now, of much interest. I also mention for reference as to the incidence of insanity and the ætiology and treatment of nervous disorders in soldiers, articles appearing in *The British Medical Journal* of the following dates: January 21, 1939, January 28, 1939, February 4, 1939, and October 7, 1939.

The Selection of Men for War Service.

I fear that my remarks concerning the origins of neurotic affections will not have shown the selection of men as fit for war service, as regards their mental make-up, to be in any way a simpler matter. It is, generally speaking, impossible to detect the potentially psychopathic individual at any ordinary clinical examination of recruits. The provision of special psychiatric examination of recruits would not be a justifiable expedient. The selection by any mental examination against the chances of serious neurosis or insanity would be cumbrous, costly and not reliable and useful.

There has lately been some Press publicity urging the procedure of psychiatric examination of recruits, and mention has been made of the employment of this system in other countries (notably in America). To the best of my belief, the provision of psychiatric examination of American recruits during the last war was by no means an unqualified success. It is, furthermore, doubtful that it would be advisable, even were it possible, to exclude men of neurotic personality from service. We have to take into consideration the fact that men of neurotic or psychopathic kind may become very good soldiers, and, indeed, one should say, some of the very best soldiers. The little book of Trotter's that I have mentioned contains a certain discussion of the value of the stable and of the unstable. He employs the term stable in an especial sense, as implying an acceptance of the fitness of things, and he stresses the value of the unstable to mankind. Certainly in time of war I should think an army of the entirely stable but a poor thing.

It is worthy of mention also that many men of somewhat subnormal mental grade make useful soldiers. I hope I shall not be misunderstood if I say that a high mental equipment is not essential for good fighting service.

On a practical basis, then, we can say that a commonsense doctor can, at an ordinary routine examination for enlistment, discard a few men as obviously mentally unfit for service—but a few only.

The past history of the individual might be of some assistance; but this will rarely be forthcoming, though any doctor should do what he can to prevent the enlistment of a definitely unsuitable man who has been his patient. The belief that military service will "make a man of him" is correct only within limits.

In training camp a good deal more can be done. During the last war men were allowed to go overseas after they were known to have had hysterical seizures, "nervous breakdowns" and so forth. Others were allowed to go who were known mental defectives and butts for their fellows. Such men were seldom useful and were usually a great nuisance and an enormous subsequent expense. Such cases should not occur again. It is during the period of training that competent medical service can prevent their occurrence.

Something more must be said later of the functions of a regimental medical officer; but, at this stage, it is to be mentioned that a wise medical officer in training camp, on proper terms with all ranks, can quickly learn a great deal of the officers and men in training, whether he sees them on sick parade or not. He can cull out some of the unsuitable.

It is, then, in training camps that some selection of fitness for service can be made and definitely unsuitable men discharged. Such men as are discharged as unsuitable should be clearly shown as constitutionally unfit, and there should be no doubt left open that they have become unfit as a result of their enlistment.

A correct selection of men must depend upon the wisdom of the medical officer; but there are perhaps a few points worth mentioning for guidance. The "amusing old soldier" type is not often a good fighting man; there should be no sentimentality about the business. The individual overflowing with the "true Digger spirit" is not likely to be good. It is suggested, too, that one should look askance at the man who talks a great deal, or who keeps a voluminous diary or who writes voluminous letters, and you might remember that a share in the pestilent job of censoring these may fall to the lot of the medical officer.

The Prevention of Neurotic Disability and the Disposal of Neurotic Personnel.

An efficient medical service can do a great deal to prevent the development of mental unfitness in soldiers, and an incompetent medical service can do a great deal to demoralize them. In consequence, partly at least, of the progress of humanitarian ideas among British people in recent times, the problems of the medical services in the present war appear even greater than they were in the past. I feel a weight of personal responsibility for a share in the development and the perpetuation of neurotic disablements from the last war and a consequent diffidence in attempting to advise you how to do better.

At the outset it must be realized that in military practice the efficiency of the service and the exigency of circumstances must at need take preference over the interests of the individual as one's patient. The function of the medical service is to aid in the placing and maintaining of efficient forces in the field. To fulfil that function, a great deal more is required than the treatment of sick and wounded and their evacuation. The field of preventive medicine in military practice is a wide one, and this applies to the prevention of mental unfitness. The atmosphere of the compensation court is, of all, that most favourable to the development and perpetuation of functional incapacity. The atmosphere of training camps and field units should be as far different from that of the compensation court as it is possible for all authorities, and especially the medical authority, to make it.

In the creation of a proper atmosphere in military camps and units the part of the medical officer is important. The medical officer who would confine his duty to the conduct of sick parades and of routine sanitary and food inspections, falls much short of requirements. Certainly to these duties he must give of his best. Careful, patient, clinical work at sick parades is essential; and it is particularly to be mentioned that a patient, prolonged hearing, followed by a thorough, complete examination, is the basis upon which the handling of a neurotic individual should be commenced. Beyond that the medical officer should settle to make himself a part of the unit for an indefinite slice of his life, and, at that, not the least interesting and useful slice. The best regimental medical officer is not one who regards a period of regimental duty as a stepping stone to work of perhaps more professional interest in a hospital. On the other hand, the job of the successful regimental medical officer can, and should be, as interesting, useful and honourable as any that a doctor

can have; and no better wish can be offered to any of you than that you attain to it.

In any unit the medical officer should be in cooperation with the combatant officers and with the chaplain over all matters of sports and entertainments. He should be an interested adviser in all matters of training and special duties. He should be an agreeable member of the mess; and he can be so even if a total abstainer. He will find himself generally somewhat older and more worldly wise than most of the combatant officers and his influence with them can be great.

Enough has been said to indicate the part of a medical officer in assisting with rapid competent training, good feeding, sanitation and comfort, recreational exercise and entertainment. His influence is very great and is the greater for the confidence he can arouse in his efficient help in sickness, injury or trouble.

This seeming digression from our subject seems advisable to emphasize the function of the medical officer in combating the discontent, inertia and boredom which may lessen the morale of a unit and render it a more favourable breeding ground for, at least, the minor neuroses.

A passing mention here seems pardonable of "the beetle" in the Foreign Legion, of the well-recognized boredom of trench warfare in the last war, and of methods, of which one already hears, to preserve the morale of "the shellfish" of the Maginot Line.

More particular reference to certain other activities is desirable. A regimental medical officer can assume a common-sense attitude regarding moderation and discretion in alcohol and venery. One might say that a moderate use of alcohol can be looked on as perhaps preventive of neurosis and leave the subject at that, except for adding that a wet canteen is desirable. The medical officer can also ensure efficient venereal prophylaxis and common-sense instruction as to the cause, prevention and cure of venereal disease, and thereby minimize the factors of mental anxiety and shame in that field. Experience has shown that these factors have at least a minor bearing on the incidence of neurosis.

I should like to say here that statements which have been made of the prevalence of drunkenness and syphilis among returned soldiers as a cause of mental and nervous disorders, I consider a gross libel upon the first Australian Imperial Force.

Much that has been said applies particularly to regimental medical officers, but a good deal of it holds with regard to medical officers in medical units and in training and convalescent depots. Concerning these last, a little should be said as to the need for efficient organization to ensure rapid transit through hospitals, convalescent depots and retraining camps. Men must not be left unduly long to deteriorate in hospitals and depots, which certainly have been in the past breeding grounds for neurotic incapacity. Rapid transit, progressive training and sustained confidence and morale can be achieved only by a hard-working, efficient medical organization.

I trust that you have not been unduly wearied by these somewhat trite remarks concerning the functions of medical officers. My experience of the moral degradation of men who have too long rotted in depots, and of the vast sums of money paid out in compensation for "shell-shock" developed in training camps, must be my excuse for inflicting them upon you.

I should like to say something now of the attitude to be adopted towards developing neurotic affections. There appears a deplorable tendency in civil practice to depart more and more from the old teaching, which classed accidia as one of the seven deadly sins, and to pander to the developing and the developed neurotic. All humane teaching despite, we have gone much too far in relieving individuals of the personal responsibility for independence and initiative and for fortitude in adversity and danger. The more so is it of the utmost importance in military practice that a deprecatory attitude be adopted towards neurotic affections. The practice of handling "shell-shocked", neurotic, hysterical or exaggerating soldiers on the same terms as wounded men for treatment and compensation is by no means good preventive or curative military medicine. To advocate a complete reversal to old-time principles, when "nerves" and unsteadiness on service were crimes and a "fugue" was a matter for capital punishment, would not be practical politics. The line of demarcation, however, between personal responsibility and disease has shifted much too far to the right, and a good swing of the pendulum in the opposite direction is indicated for so long, at least, as our national existence depends upon our ability to defend it. It is incumbent upon the medical service to adopt the deprecatory attitude. To be precise as to that attitude is difficult; but it is commended to you to show a disregard for symptoms without organic cause, to insist upon a limitation of considerations to the anatomical probabilities of organic disabilities, ignoring functional embroidery, and to focus attention upon the capabilities of other individuals suffering the same disablements.

Without labouring this matter, I must say that the attitude towards it of the members of the medical profession both within and without the service is of an importance that cannot be over-stressed. A stern attitude can also be encouraged in all ranks of the services, and I would say not a humorous attitude. Jocular references to "the direction of the wind" and so on may have their time and place, but can be most untimely.

I should like here to follow precedent and remark that no medical lecture can be considered complete without the usual solemn warning that patients considered neurotic may turn out to have some organic affection—most indeed do! Having done my duty by that warning, I would counsel you not to pay it too much heed.

It is obvious that some men believed, and justifiably believed, neurotic will later suffer from tuberculosis, organic cardiac disorders, tumours, disseminated sclerosis, Huntington's chorea and so forth. Soldiers should not, however, be lightly invalided in order that the chance of mistake, injustice and possible danger to the individual may be avoided. In civil practice it is incumbent upon practitioners to be prepared to take a certain risk with patients in order to avoid the worse risk of fostering neurosis. The risk of encouraging to effort those suffering cardiac and pulmonary disorders is probably not so great as many practitioners believe. This opinion is based on a large experience of the subsequent documented history of cases of "missed diagnosis".

In military practice certainly the need to take such a risk on the patient's behalf is greater; but here again, with younger subjects, the risk of error, particularly in regard to cardiac conditions, is much less than it would be with men in their later decades. If a man in his forties complains of heart pain and is sent on a route march, he may possibly die of coronary disease. That would not be likely with a man in this twenties.

In this connexion I ask your patience for some reminiscences of ancient history. I had the privilege in 1915 of meeting in a trench Purves Stewart. He was conducting clinical examinations "on the spot", and was quite excited by the discovery of the prevalent tachycardia. He was good enough to expound at some length. His continued journey along the front revealed that practically all men who had been a considerable time on the Peninsula showed a definite tachycardia. The cause of this was later the subject of much speculation and discussion; the factors of long-continued exposure to risk without relief periods in distant billets, of the long-continued boredom of inaction, dietary deficiencies and dysenteric infections, have been debated. For our purpose it suffices to state that in the subsequent twenty-five years there appears to have been no frequent general aftermath of that tachycardia, whether it was organic or functional.

I should like to relate also the experience of a certain battalion medical officer of the First Division in 1915. He was considered hard, but was universally esteemed and loved by his unit. He was widely known by an affectionate objectionable nickname. It was shown that he evacuated fewer men from the battalion than did any other regimental medical officer. His critics suggested that by holding men he had probably been responsible for a number of deaths. By a careful follow-up of his troops, he confounded his critics and established that no greater proportion of the

men he did evacuate died in hospital. That story is one with a moral.

Mention should also be made here of the consideration given to the matter of functional cardiac disorder in soldiers at a recent session of the Royal Australasian College of Physicians. A conclusion arrived at was that there was no likelihood of an organic cardio-vascular aftermath in this condition. A submission sent, I believe, from the College of Physicians to the Defence Department as to nomenclature in such conditions, and as to the treatment and disposal of the patients, is commended to your attention. In that connexion it is stressed that the words "heart" and "cardiac" should be avoided in connexion with any supposedly neurotic disorders. Furthermore, use of the words "neurosis" and "neurasthenia" and "psychasthenia" should also generally be avoided. One should hesitate to use the words "nervous" or "nerves", and one's diagnosis should be limited, as far as possible, to organic affections. The practice also, forced upon us by compensation legislation, of revealing to the patient and discussing with him the medical terms of diagnosis (spondylitis, bronchiectasis, epilepsy and the like) is to be mentioned as a particularly pernicious one.

Something has been said of a judicious disregard of symptoms and of the judicious holding of men in their units. The other side of this matter deserves attention. It is not good for morale to have a number of ailing or constantly complaining men in a unit. Neurotic complaints are perhaps particularly "infectious". A battalion cleared of the ailing personnel it has been carrying can be wonderfully changed in atmosphere and effectiveness. There is thus a time for judicious evacuation of the neurotic individual. The question of sending him to hospital and his treatment is not one that can be opened up here. Generally speaking, if the neurosis is genuine and severe, a prompt and final invaliding from the service is indicated.

In invaliding a neurotic patient all medical officers through whose hands he passes from his unit to the discharging medical board should insist on the recoverable nature of his affection. Notes should be made as to the real history of onset and of the medical officer's opinion as to inherent constitutional liability. In short, any action that can be taken to prevent a neurotic individual from becoming pensioned is not only advantageous to the State, but is also the greatest service that can be done for the patient. The possibility of lump-sum compensation for neurotic disablement is another matter that should be kept in mind. An article entitled "Nurturing a National Neurosis", by Aring and Bateman, in *The Journal of the American Medical Association* of October 2, 1937, deserves the attention of all those interested in these matters.

As has been said, I fear that the problem of neurotic disablement may be greater than in the past. My impression is that the attitude of the professions, both legal and medical, towards compensatable neurotic disability has had in recent decades an ill effect upon the quality of our people. At the same time I do not wish to leave with you an exaggerated impression, or a defeatist one. The percentage of men to whom we have been referring is, of course, a minor percentage; but a minor percentage of any 100,000 men we may come to accept for military service would provide hundreds of neurotic patients—an affliction and a spreading evil in their units, a chronic load on hospitals and transport, and an enormous potential expense in subsequent compensation. That small percentage should be made as small as possible.

To conclude, I should like to turn to the brighter side of the picture. Of the thousands of young men who may now come to enlist, the vast majority will be the equals or the superiors of those who served in the past. They will have, on the average, perhaps an even finer physique and an even greater freedom and independence of spirit. They are no less likable, and to assist them in time of trial they are blessed with no less humour, though a quickened tempo of their humour makes it harder for an older generation to understand. I can wish you no better fortune than that of having a share in the care of them, and I hope you will make a better job of it than we of that older generation were able to do in the past.

C. K. PARKINSON, M.C., Senior Medical Officer, Repatriation Department, Sydney.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on July 19, 1939, at the Alfred Hospital, Melbourne. The meeting took the form of a number of clinical demonstrations by members of the honorary medical staff of the hospital and of a symposium on the use of sulphanilamide. Parts of the report of this meeting appeared in the issues of December 30, 1939, and January 13, 1940.

Banti's Disease.

DR. G. A. BIRNIE showed a girl, aged twelve years, who had had no ill health or illness until October 26, 1938; on that date she had woken from sleep and felt nauseated, and an hour later had vomited pure blood. She was admitted to hospital on October 27, 1938.

On examination the child was rather pale. The pulse rate was 120 per minute. The systolic blood pressure was 95 and the diastolic pressure 60 millimetres of mercury. No abnormality was detected in the heart, lungs or central nervous system. The spleen was just palpable. A blood count gave the following information: the erythrocytes numbered 2,800,000 and the leucocytes 5,300 per cubic millimetre, and the hæmoglobin value was 60%. There were two other children in the family and both were healthy. No relevant information was gained from inquiry into the family history.

On the next day, October 28, the child vomited seven ounces of dark blood; but no further hæmorrhage occurred from then until her discharge from hospital on November 26, 1938. A blood count on November 16 gave the following information: the erythrocytes numbered 3,500,000 per cubic millimetre and the hæmoglobin value was 60%. The corpuscles were of normal fragility. The Van den Bergh test elicited the following results: direct, negative; indirect, 0·4 unit. There was no response to the Fouchet or the Wassermann test. Examination after a barium meal revealed no abnormality.

On December 31, 1938, the child was readmitted to hospital. For the previous week she had felt languid and tired, and on the evening of her readmission to hospital she vomited about 15 ounces of blood. On examination her pulse rate was found to be 108 per minute. Her temperature was 99·6° F. The hæmoglobin value was 60%. No abnormality was detected in the heart or lungs. The spleen was palpable three fingers' breadth below the costal margin. The liver edge was palpable.

Between December 31, 1938, and February 15, 1939, the patient vomited on various occasions a total amount of about 103 ounces of blood and received five blood transfusions. She returned home on April 22, 1939, in a very satisfactory condition. The hæmoglobin value was 80%, the erythrocytes numbered 4,000,000 and the leucocytes 8,000 per cubic millimetre. Platelet counts were made on two occasions, the respective results being 34,000 and 73,000 per cubic millimetre. Fragility began in a 0·55% saline solution and was complete in a solution of 0·4%. The spleen was palpable. The child had remained in excellent health since her discharge from hospital, and Dr. Birnie asked for opinions as to the advisability of splenectomy.

Possible Biliary Cirrhosis.

Dr. Birnie's second patient was a woman, aged forty-two years. Four years previously, after the weaning of her

last child, an intractable pruritus had developed all over her body; this was associated with a tendency for her hair to fall out and with a sallow complexion. No obvious loss of weight had occurred, and there had been no pain, no hæmorrhages or purpura, and no digestive disturbance. The bowels were constipated.

On examination her temperature was found to be 98° F. and her pulse rate 80 per minute. The systolic blood pressure was 110 and the diastolic pressure 70 millimetres of mercury. The skin was excoriated and of a general pale "jaundice" colour. Pigmentation was present. There was no rash and there were no purpuric spots; the conjunctivæ were stained. The apex beat was four inches from the middle line, in the fifth intercostal space; no cardiac dulness was detectable to the right of the sternum. The heart sounds were regular; there was a soft apical systolic bruit. Examination of the lungs revealed some increase in pitch of the breath sounds, with prolonged expiration at both bases and scattered crepitations. Examination of the abdomen revealed laxness, but no tenderness. The liver edge was palpable, running obliquely across the abdomen above the umbilicus; it was smooth. The edge of the spleen was palpable on inspiration. No abnormality was detected in the central nervous system. There was no response to the Casoni test, the hydatid complement fixation test or the Wassermann test. The Van den Bergh test elicited the following results: direct reaction, 12 seconds; indirect reaction, 4·8 units. The Fouchet test elicited no reaction. The sugar tolerance curve was normal. Biopsy of the skin revealed no hæmosiderin. Radiological examination of the renal tract revealed no abnormality; that of the chest revealed fibrosis, with possible bronchiectasis at the bases of both lungs; that of the gall-bladder showed that it was faintly outlined with the dye. The corpuscular fragility and a blood film were normal. Renal function tests revealed no abnormality, and examination after a test meal gave normal results. The urinary diastase was two units. Analysis of the fat in the fæces gave the following results per 100 grammes of dried fæces: split fat, 38·3 grammes; unsplit fat, 10 grammes; total fat, 48·3 grammes. Dr. Birnie said that the history suggested a type of biliary cirrhosis and no treatment had yet yielded any relief of symptoms.

Radiological Exhibits.

DR. ALAN MACKAY showed X ray films from a series of cases in which the diagnosis had been proved either by biopsy or autopsy.

A male, aged eighteen years, was first seen in March, 1938, complaining of difficulty in swallowing. A barium meal revealed cardiospasm and also sclerosis of the seventh dorsal vertebra. The patient disappeared before any further investigation could be carried out, and was not seen again for six months, when he reappeared, suffering from paraplegia. The seventh dorsal vertebra then was densely sclerosed and bony bossing was present anteriorly and to each side. The associated disks were also slightly narrowed. The general condition of the patient was good. After laminectomy some months later, Dr. R. A. Willis had reported that a microscopic section exhibited the characteristics of hæmangioma.

A male, aged twenty-three years, gave a history of bouts of diarrhœa lasting about a fortnight, for the previous ten years. During the attacks he passed eight to twelve liquid motions per day, containing mucus and occasionally blood. On admission to hospital he looked ill, having had diarrhœa for about two months, with eight to twelve motions daily and dull abdominal pains. He had lost weight and was anæmic. His mother had died at the age of thirty years from a "growth in the bowel", and his maternal grandfather had died of "diarrhœa". X ray examination revealed gross polyposis of the colon (congenital type), and this finding was confirmed by sigmoidoscopy.

A female, aged sixty years, had had varicose veins for sixteen years, and on admission to hospital had ulcers on both legs, with some redness and pitting œdema. In the base of one ulcer calcareous masses could be seen and felt. X ray examination revealed widespread irregular calcium deposits in the superficial soft tissues, due to *calcinosis cutis*.

A female, aged sixteen years, was first seen in February, 1936, complaining of pain in the left thigh and of debility. X ray examination revealed a periosteal reaction along the middle third of the femur, of doubtful ætiology. This periosteal thickening increased and later diminished after deep X ray therapy; the condition was regarded as secondary neuroblastoma. In 1938 metastases appeared in the lungs and in the soft tissues of the pelvis. At autopsy later the same year Dr. Willis found numerous metastases throughout the body from a neuroblastoma, and regarded the primary lesion as being situated in the lower left portion of the sympathetic chain.

Another series of films were from patients showing primary neoplasms in various situations in the lungs, for comparison with a series from patients showing pulmonary metastases simulating primary growths, small primary deposits being present in the prostate, bladder or stomach.

Acute Nephritis.

DR. GUY SPRINGTHORPE discussed three cases of acute nephritis in children. The first case was of the more common type. Considerable obvious œdema was present and the blood pressure had been moderately raised in the earlier stages. The urinary findings were characteristic. Progress had been uneventful, so that one month after the onset no external œdema was apparent, the blood pressure had fallen and the serum albumin content was normal. The urine contained only a small quantity of albumin, and a few red blood corpuscles were found on microscopic examination. The next two cases were of the severe cerebral type, with convulsions; one had terminated in death. Dr. Springthorpe said that in these the seizures were considered to be due to œdema of the brain, the associated sign of a very high systolic blood pressure being present. The chief object of treatment at that stage was diminution of the cerebral œdema. It was of interest that in one case there was no evidence of external puffiness, and in the other puffiness was confined to the face. The fact that so-called uræmia was not an important factor in this condition was also exemplified. Dr. Springthorpe said that some rise of the blood urea level was usually found, but the degree bore no relationship to the gravity of the disease in the acute phase.

The first patient shown by Dr. Springthorpe was a male, aged four years, who had been admitted to hospital on June 12, 1939. He had had a sore throat three weeks earlier, followed by a cold in the head. The child was cross and irritable. Six days previously he had vomited and become feverish. For the past five days puffiness of the face had been present, and the urine had been brownish in colour and diminished in quantity.

Physical examination revealed considerable swelling of the face and a moderate degree of œdema of the legs. No abnormality was detected in the heart, lungs, abdomen and central nervous system. The systolic blood pressure was 130 millimetres of mercury. The urine contained a great quantity of albumin, a considerable amount of blood and some pus cells and epithelial casts.

The child was kept at rest and given a light diet, consisting of milk, cereal and fruit. After the second week he was allowed white meat occasionally. The fluid intake was normal and the salt intake diminished. Magnesium sulphate was given by mouth and one or two watery motions per day resulted.

On June 16 the œdema was slightly less. On June 22 there was still some œdema of the legs and face. The urine contained 0·3 gramme of albumin per 100 cubic centimetres (Esbach) and some blood. The systolic blood pressure was 120 millimetres of mercury. On June 30 the hæmoglobin value was 71% and the systolic blood pressure 125 millimetres of mercury. On July 1 the child was given 10 cubic centimetres of pooled human serum as a prophylactic against measles, owing to an outbreak in the ward. The systolic blood pressure was 105 millimetres of mercury. On July 4 an estimation of the serum protein content gave the following results per 100 cubic

centimetres: albumin, 4·0 grammes; globulin, 3·5 grammes; total proteins, 7·5 grammes. On July 8 no œdema was present. The systolic blood pressure was 80 millimetres of mercury. The urine contained a trace of blood and five milligrammes of albumin per 100 cubic centimetres (Esbach).

Dr. Springthorpe's second patient was a female, aged ten years, who had been admitted to hospital on June 12, 1939. Two days before her admission she had complained of general malaise. Three days later severe headache and vomiting developed and had persisted. Twelve hours before her admission to hospital the child became delirious and shortly afterwards began to have convulsive seizures.

On examination the child was unconscious. No abnormality was detected in the heart, lungs or abdomen. Examination of the central nervous system revealed that the deep reflexes were active; bilateral ankle clonus was present and the plantar reflexes were extensor in type. The urine contained a considerable amount of albumin and some acetone and blood. The cerebro-spinal fluid was normal and not under increased pressure. The urea content of the blood was 39 milligrammes *per centum*.

Convulsions and twitching recurred throughout the child's first day in hospital, but diminished after the performance of lumbar puncture, the administration of one-twelfth of a grain of morphine and the inhalation of a little chloroform. The bladder was found to contain eight ounces of urine on catheterization; the child had not passed urine during the previous eighteen hours. Sixty grains of bromide were given rectally.

On June 13 the child was quiet and fairly rational. She was receiving half a grain of "Luminal" three times a day. On June 15 she had a convulsive seizure lasting for five minutes. On June 17 she was quiet and rational. Examination of the central nervous system on that day revealed no abnormality. The dosage of "Luminal" was decreased to half a grain twice a day. On June 21 the child's general condition had improved, although she still had headache. The systolic blood pressure was 170 millimetres of mercury. The urine contained less blood and albumin.

Subsequent treatment consisted of rest, a light diet of milk, cereal and fruit, and the administration of magnesium sulphate by mouth daily. The fluid intake was normal and the salt intake low. On June 23 the systolic blood pressure was 140 millimetres of mercury. On June 30 it was 120. On that date the urine contained a trace of blood and albumin. On July 10 the systolic blood pressure was 100 millimetres of mercury. Prior to this date the child had had two to five watery motions per day, due to the magnesium sulphate; at this stage the dose was reduced. The headache had ceased. On July 18 the systolic blood pressure was 105 millimetres of mercury. No albumin had been present in the urine for the previous five days, and only a few red blood cells were found on microscopic examination.

Dr. Springthorpe, in illustration of the two preceding cases, showed detailed charts giving daily observations of the blood pressure, the fluid intake and output, the number of bowel actions, and the specific gravity, albumin content and blood content of the urine.

Dr. Springthorpe finally discussed the case of a female child, aged eight and a half years, who had been admitted to hospital on June 28, 1939. She had had general malaise, puffiness of the face and a slightly sore throat for one week prior to her admission. For the two days preceding her admission to hospital she had been drowsy and had had several attacks of vomiting. She had had headache for one day.

On examination the child was drowsy and irritable if disturbed. Slight muscular twitchings were present and her face was puffy. The systolic blood pressure was 160 millimetres of mercury. The urine contained a considerable amount of albumin and blood. The blood urea level was 169 milligrammes *per centum*. Examination of the lungs revealed a few rhonchi at the bases. The respiration rate was 24 per minute. No abnormality was detected in the heart or central nervous system.

The child was given an intramuscular injection of five cubic centimetres of a 10% solution of calcium gluconate; she was also given a magnesium sulphate enema. On June 29 she had a short convulsive seizure. She was semi-comatose and was passing very little urine. The temperature rose to 104° F. and the respiration rate to 44 per minute. She was given a further 10 cubic centimetres of calcium gluconate, one-sixteenth of a grain of morphine and a magnesium sulphate enema. Lumbar puncture was performed and six or seven cubic centimetres of clear fluid were withdrawn; the fluid was under slightly increased pressure, about 200 millimetres of water. The child died soon after midnight.

A *post mortem* examination was carried out. The brain was congested, but otherwise normal. The heart was normal. The lungs were very congested and œdematous, exuding watery fluid. The liver, spleen and suprarenal glands were normal. The gastro-intestinal system and pancreas were normal and the pelvic organs were normal. Both kidneys were slightly engorged and oozed a little blood when cut. The pattern was clear and the capsule was easily stripped, a smooth surface being left. The congestion was much more pronounced in the medulla than in the cortex. When examined microscopically the kidneys showed typical signs of early acute glomerulo-nephritis. Many of the glomeruli were bloodless. There was increased cellular accumulation, and a few polymorphonuclear leucocytes were present.

Dr. Springthorpe expressed his thanks to Dr. F. K. Norris and Dr. R. A. Willis for permission to give details of this case.

Benign Tumour of the Stomach.

DR. J. ERSKINE SEWELL showed a female patient, aged thirty-seven years. There was nothing significant in her past history. She had had nine children, of whom seven were living and well. Her husband suffered from a chronic duodenal ulcer. Her illness had begun two and a half years earlier, with persistent flatulence and a feeling of fullness even after small meals. Fifteen months prior to the meeting she had begun to suffer from intermittent attacks of severe epigastric colicky pain, described by herself as severe labour pains. They were not related to meals, and on occasions awakened her at night. Not infrequently they were associated with severe vomiting. Pain and vomiting then became more frequent. The patient lost two stone in weight, and suffered from increasing weakness and anorexia. Eighteen months prior to the meeting she had a hæmatemesis, ten ounces of blood being vomited. On occasions she noticed that her stools were tarry.

Physical examination revealed no abnormality other than epigastric tenderness. On April 20, 1938, examination by means of a fractional test meal (gruel) revealed no abnormality. A similar examination on May 12, 1938, revealed no abnormality other than an absence of free acid and a low total acidity. On April 22, 1938, a cholecystogram was made and revealed no abnormality. On December 20 radiographic examination after a barium meal revealed the presence of infiltration along the lesser curvature of the stomach, near the *incisura angularis*. This was thought to be carcinoma. On December 23 a gastroscopic examination was made, and it was considered that the tumour was probably benign. On December 28 operation under high spinal anæsthesia was performed by Dr. Leonard Ball. A large innocent leiomyoma, weighing 150 grammes, was removed locally. Convalescence was uneventful.

On February 14, 1939, a blood examination gave the following information: the hæmoglobin value was 48%, the erythrocytes numbered 4,500,000 and the leucocytes 7,000 per cubic millimetre; a blood film was normal. The patient was given large doses of iron. On July 12, 1939, the hæmoglobin value was 104%, the erythrocytes numbered 4,600,000 and the leucocytes 8,000 per cubic millimetre; a blood film was normal. On April 4, 1939, a radiological examination was made after a barium meal. Slight flattening was present along the lesser curvature of the stomach at the site of the old myoma.

Chronic Superficial Gastritis.

Dr. Sewell next showed a male patient, aged twenty-nine years. He had been healthy until eleven years previously, when after a severe septic infection of the throat he had noticed flatulent indigestion, with a feeling of fullness and nausea after meals. He suffered from anorexia, and his loss of weight and strength became very pronounced. His weight at the age of seventeen years was eleven stone and nine pounds; at the time of examination on January 10, 1939, it was seven stone and thirteen pounds. He had therefore lost three stone and ten pounds. Clinical examination revealed no abnormality, except emaciation and a birth injury to the head.

A number of investigations were undertaken. Radiographic examination of the lungs, antra and pituitary fossa revealed no abnormality. Examination after a barium meal, on January 31, revealed ptosis of the stomach; there was a residue of about one-quarter after five hours. The first part of the duodenum was deformed. On February 3 a blood examination and examination after a test meal revealed no abnormality. On February 8 radiographic examination after a barium meal revealed a deformity of the duodenal cap; there was a small residue in the stomach after five hours. No ulcer crater was detected, but the appearances were consistent with duodenal ulcer. The meal passed normally through the small bowel. The terminal ileal coil was rather dilated, but otherwise apparently normal. On February 19 a gastroscopic examination was made. The mucosa was very inflamed, and pus and mucus were lying between the folds. No crater was seen, but some very superficial ulceration was noted on some of the mucosal folds. A diagnosis of superficial gastritis was made.

Dr. Sewell said that the patient had had routine stomach washouts with lime water for the past six months, and had eaten a smooth diet, such as was used for patients suffering from gastric ulcer. He was feeling slightly better, and had gained nine and a half pounds in weight.

Duodenal Ulcer.

Dr. Sewell's next patient was a male, aged fifty-three years, who had a history of dyspepsia typical of duodenal ulcer, of thirteen years' duration; the diagnosis had been confirmed at intervals by radiographic examination after a barium meal. A test meal examination revealed a considerable amount of free acid and a very high total acidity; the curve was of the typical "climbing" type. The patient was admitted to hospital on May 1, 1939, suffering from severe pain and vomiting, which had been present for one week. His weight was seven stone and nine pounds.

He was given routine ulcer treatment for five days, and continued to have much pain. On May 5 the administration of "Amphogel" by means of the continuous drip method was begun, and continued until May 23. Gastric analysis revealed no free acid during the day, but at 10 p.m. and 2 a.m. the acidity was fairly high. At the time of the meeting the patient weighed nine stone and six pounds—a gain of almost two stone—and his condition was satisfactory.

Dr. Sewell then showed a male patient, aged thirty-nine years, who had suffered from recurrent dyspepsia for ten years. Six years previously the presence of a duodenal ulcer had been confirmed by radiographic examination after a barium meal, and the diagnosis had been verified at intervals since then. The patient had been subjected to appendicectomy two years previously, after an appendiceal abscess; he had been well since then until some five weeks before his admission to hospital, when the dyspepsia returned. Five days before his admission, severe persistent vomiting of copious amounts of fluid had occurred. His weight on admission to hospital on May 18, 1939, was eleven stone and four pounds.

Five days after his admission to hospital treatment was begun with "Amphogel" by the continuous drip method; it was continued for fifteen days, when the patient's condition was satisfactory. Radiographically the ulcer did not appear to be quite healed. On June 18 the patient's weight was eleven stone and ten pounds.

Sterility.

DR. J. A. TROUP discussed sterility and demonstrated the use of the Rubins tubal insufflation apparatus.

Amniotic Contrast Media.

DR. ROBERT FOWLER showed some skiagrams illustrating the use of amniotic contrast media. After *paracentesis amnii* in a woman five months pregnant, 30 cubic centimetres of the liquor were replaced by 30 cubic centimetres of "Uroselectan", and skiagrams were taken forthwith. In these skiagrams the fœtal shadow was intensified by the contrast medium and a "filling defect" showed the position of the placenta. The method had been used by other observers investigating cases of *placenta prævia*. In Dr. Fowler's case termination of pregnancy had been decided upon on account of cerebral tumour, and the opportunity had been seized to test the work of Snyder and Rosenfield on intrauterine respiratory movements. These observers had been able to show that breathing of amniotic fluid was a normal mechanism in the full-term fœtus of man, cat, pig and guinea-pig. Dr. Fowler had been able to confirm this finding in full-term guinea-pigs, and showed coloured photographs to illustrate his results. In the human being, however, he had shown on two occasions that no such respiratory movements occurred at the fifth month.

Headache following Spinal Anæsthesia.

Dr. Fowler next showed a patient who had suffered from unusually severe headache after spinal anæsthesia. It had been decided to investigate the mechanism of these headaches, and accordingly a series of parallel observations were made on the pressure of cerebro-spinal fluid and the systemic blood pressure of all patients subjected to spinal anæsthesia. It appeared that the normal pressure of cerebro-spinal fluid when the patient was in the sitting posture and lumbar puncture was performed averaged 200 millimetres of fluid (manometer reading). In the patient with severe post-operative headache it was found, contrary to expectations, that the tap remained dry and that no pressure of cerebro-spinal fluid was registered. An aspirating syringe withdrew no fluid. The injection of 50 cubic centimetres of saline solution was needed to restore the cerebro-spinal fluid pressure to normal; relief of the headache, which lasted thirty-six hours, was immediate, but a relapse then occurred. A repetition of this procedure was again undertaken with similar findings, and partial relief was experienced from the injection of 50 cubic centimetres of saline solution. Although still suffering from slight headache, the patient slowly recovered within a few days.

Fœtal Electrocardiograms.

DR. H. MENDELSOHN demonstrated fœtal electrocardiograms, recorded (i) indirectly, according to the method of Strassman, and (ii) directly, from a premature fœtus delivered by Cæsarean section, whilst the placental circulation was still intact.

The fœtal tracings showed a right-sided preponderance, but no other significant departure from the normal adult curve was detected.

The impulse from a five months' fœtal heart *in utero* was not apparent on curves taken from maternal leads. Strassman, at the Mayo Clinic, had found that such an impulse was not with any constancy found before seven months.

Genital Prolapse.

DR. A. OLDHAM showed two patients who suffered from severe genital prolapse. He said that by replacing the procident mass and requiring the patient to bear down, it was possible in a moment or two to restore to normal a condition that had taken some years to develop. In this way it could be seen that the two cases differed somewhat in type. In one, the classical *prolapsus uteri*, the viscera were extruded in the following order: anterior vaginal wall and bladder from below upwards, *cervix uteri*, posterior vaginal wall from above downwards. In the other case a long, loose uterus had prolapsed by "telescoping" the vagina. In this case the first structure to be extruded was the *cervix uteri*; the anterior and posterior fornices next appeared.

Regarding operative treatment, Dr. Oldham said that adequate vaginal plastic procedures were sufficient to give complete cure in most cases. There was no necessity to perform the so-called "round trip", which included abdominal as well as vaginal procedures.

Trichomonad Vaginitis.

DR. H. G. FURNELL showed several patients affected with trichomonad vaginitis. He demonstrated the method of microscopic detection of the infecting organisms in fresh preparations. He further demonstrated the standard methods of treatment, including insufflation of "Picratol" powder.

The Uses of Cauterization.

DR. C. S. WOOD demonstrated the uses of cauterization with the diathermy needle in cases of erosion, follicular cervicitis and endocervicitis.

Pathological Exhibits.

DR. JOHN A. MCLEAN showed a number of bone marrow smears, obtained by sternal puncture, to illustrate different phases of pernicious anæmia and iron deficiency anæmia.

DR. A. H. JOLLY showed a number of classical museum specimens of gynæcological interest.

DR. R. A. WILLIS showed pathological specimens of general interest.

The Sulphonamides.

MISS JEAN C. TOLHURST, M.Sc., of the Baker Medical Research Institute, in opening the symposium on the sulphonamides, said that she wished to stress the fact that there were now available quite a variety of sulphonamides, and showed a lantern slide giving their formulæ (Durie, 1938). She said that sulphanilamide (also known under the trade names of "Prontosil album", "Prontylin", "Streptocide" *et cetera*) was p-aminobenzenesulphonamide. "Prontosil red" and "Prontosil soluble" and "Soluseptasine" were broken down in the body to sulphanilamide and closely related compounds, and the concentration of these substances in the body fluids could be estimated. "M & B 693" did not break down to sulphanilamide, but was itself diazotizable, and its concentration in the body could be measured. "Uleron" and "Proseptasine", however, were not diazotizable, so that the dosage was empirical and the rates of absorption and excretion were not known.

Discussing specific action, Miss Tolhurst said that sulphanilamide acted specifically against Group A hæmolytic streptococci. It was effective in the treatment of erysipelas, *otitis media*, puerperal fever and cellulitis; but its value in tonsillitis and scarlet fever was doubtful. The drug was active against the meningococcus, the gonococcus, *Bacillus proteus* and *Bacillus coli*. There had been a few good clinical reports of success in *Bacillus welchii* infections, and in *Staphylococcus aureus* infections when large doses were given. "Soluseptasine" and "Proseptasine" were useful for mild streptococcal infections, and owing to their low toxicity might be used for patients who could not tolerate sulphanilamide. "Uleron" was active against staphylococci and gonococci. It often produced immediate clinical improvement, but relapses were said to be frequent. "M & B 693" seemed to be quite as good as sulphanilamide; but it was especially active against the pneumococcus and the gonococcus. It was the only one of those drugs which had any effect on *Streptococcus viridans*. There had been several reports of definite clinical improvement in cases of subacute bacterial endocarditis. Other reports suggested that "M & B 693" might be as useful as "Uleron" in the treatment of staphylococcal infection; at least it should be tried in cases in which there was no response to "Uleron".

Miss Tolhurst then referred to dosage. She said that in severe infections it was necessary to give large doses of sulphanilamide for a few days until there was obvious clinical improvement, and then to reduce the dose gradually, ceasing treatment only when the patient had been clinically well for several days. She showed a second lantern slide on which was set out the scheme of dosage advocated by Banks for the treatment of meningococcal meningitis. She said that young children tolerated larger doses in relation to body weight than did adults. The dose was reduced for persons aged over forty years. In the treatment of meningitis it was of special interest that sulphanilamide given by mouth was rapidly absorbed into the cerebro-spinal fluid and reached approximately the same concentration as that attained in the blood (Banks, 1938). Sulphanilamide solution and "Soluseptasine" were quite suitable for intrathecal administration, although it was now thought unnecessary to use this route. Whitby gave for pneumococcal pneumonia five grammes of "M & B 693" in the first twelve hours, in doses of two, two and one grammes, followed by one gramme three times a day for six days, a total of 23 grammes in a week. That plan of dosage had been followed at the Alfred Hospital. Miss Tolhurst then showed a third lantern slide, giving the dosage of "M & B 693" recommended for gonococcal infections. Batchelor and others recommended for a man three grammes daily for five days, followed by one to two grammes daily for five to nine days, and for women two grammes a day for five days, followed by one and a half grammes a day for five days. In the treatment of vulvo-vaginitis in little girls aged from three to ten years and weighing from two to five and a half stone, Brown (1939) gave 0·25 gramme of "M & B 693" four times daily for four days, a total of four grammes.

Miss Tolhurst went on to say that urinary infections responded to sulphanilamide or "M & B 693". She showed another lantern slide setting out a table compiled by Melton and Beck (1939), analysing 71 cases of urinary infection treated with "M & B 693". Melton and Beck gave three grammes daily and later found that 1·5 to 2·0 grammes gave equally effective results. Most of the patients received 10 to 20 grammes of the drug. Melton and Beck found that whereas the action of sulphanilamide was enhanced by alkalinity of the urine (produced by the administration of 0·5 gramme of sodium bicarbonate with each dose), in the case of "M & B 693" there was almost the same degree of bactericidal action in acid urine as in alkaline urine. They considered that "M & B 693" was a more powerful bactericide than sulphanilamide. Most of the failures encountered were in chronic urinary infections with a focus of infection such as calculus or bladder diverticulum, or when *Streptococcus fæcalis*, known to be resistant to the sulphonamide drugs, was present. Fortunately, the mandelates were effective against *Streptococci fæcalis*. It was important that patients should not drink too freely while under treatment with the sulphonamides, as this lowered the concentration in the body fluids. It followed logically that the treatment of toxic reactions was to force fluids.

Miss Tolhurst then went on to discuss the mode of action. She said that many theories had been advanced to explain the mode of action of the sulphonamides. In the concentrations attainable in the blood (10 to 15 milligrammes *per centum*) sulphanilamide caused bacteriostasis. Reproduction of the bacteria was slowed down and finally inhibited. It might be that some essential food substance or enzyme necessary for bacterial multiplication was destroyed (McIntosh and Whitby, 1939). It remained for the bodily defence mechanism to deal with the infection. It was believed by some workers that that mechanism should be reinforced by simultaneous treatment with a specific vaccine or serum. Certainly, in the present state of knowledge, sulphonamide treatment should not replace serum therapy when that was available; but the two methods might well be combined in severe infections. In the concentrations attainable in urine (100 to 300 milligrammes *per centum*) sulphanilamide was bactericidal.

Speaking of toxic effects, Miss Tolhurst said that following administration of the sulphonamides mild toxic effects such as giddiness, nausea and slight cyanosis were common and did not indicate that the drug should be discontinued. Cyanosis, which often occurred in the first twenty-four to thirty-six hours, was frequently due to anoxæmia, though methæmoglobin and sulphæmoglobin might be produced. Methylene blue, given in doses of one to two grains by mouth every four hours, was said to cause the rapid disappearance of cyanosis (Hartmann *et alii*, 1938).

"M & B 693" was often less well tolerated than sulphanilamide. It caused vomiting in 5% to 10% of cases.

Attempts had been made to overcome this by mixing the drug with milk or fruit juices or by giving large quantities of glucose. "M & B 693" was too insoluble for parenteral administration, but the more soluble sodium salt had recently become available and was suitable for injection.

The development of a rash had been reported quite frequently. It varied in type and might be morbilliform or urticarial. It might occur as early as the second day, but it was more usual between the eighth and the fourteenth days of treatment (Lloyd *et alii*, 1938). Miss Tolhurst said that patients should be warned against sunbathing during treatment with sulphonamides, and simultaneous treatment with ultra-violet light might cause severe local and general reactions (Hallan, 1939).

Hæmolytic anæmia might occur between the third and seventh days of sulphanilamide therapy, and was amenable to treatment.

Miss Tolhurst then said that about twenty cases of granulocytopenia had been reported. Most of these patients had received sulphanilamide, but at least one had had "Proseptasine" and at least one "M & B 693" (54 grammes in eleven days) (Johnston, 1938). Johnston had analysed ten cases. Nine of these patients had had large doses (from 30 to 94 grammes); but it might be of more significance that they were treated for a period longer than fourteen days. Granulocytopenia was probably due to idiosyncrasy. Warning symptoms were infrequent, but "drug fever"—the development of a high temperature following several days of low temperature—should be regarded as a danger signal, and cell counts should be made. Recent work suggested that disturbances of pigment metabolism and of hæmatopoietic function by sulphanilamide were indicated by the excretion of porphyrins in the urine. "M & B 693" was believed to be only about one-fourth as toxic as sulphanilamide, not to cause excretion of porphyrins and to be much less likely to induce granulocytopenia (Cook and Sutton, 1938). However, five cases of hæmaturia after "M & B 693" had been recorded, and in two of these there was severe abdominal pain (Adalja, 1939; Hanssen, 1939; and Southwell and Cooks, 1939). Sulphanilamide might cause hæmaturia occasionally, and jaundice and acute yellow atrophy of the liver had been reported.

With regard to polyneuritis following treatment with "Uleron", Miss Tolhurst said that she was able to quote only three cases from the German literature. The first patient had had 30 grammes of "Uleron" (Bürger, 1938), the second 32 grammes and the third 18 grammes (Freusberg, 1938). Motor weakness in the legs had suddenly developed from three to fourteen days after treatment had ceased.

Miss Tolhurst thought that it was fair to conclude from the data so far reviewed that "M & B 693" held pride of place among the sulphonamide drugs, though that opinion might need to be altered as time went on and more extensive clinical reports were available. "M & B 693" was active against a wider range of bacteria than any of the other drugs. Its effect on lobar pneumonia was notoriously hard to assess because of the many variables and the fact that prognosis was often good; but the successful treatment of Type III pneumococcal pneumonia and of pneumococcal meningitis could not be ignored. "M & B 693" was effective in smaller doses than sulphanilamide and in general it appeared to be less toxic. Unfortunately it was more expensive.

Whichever sulphonamide was used, severe infections demanded relatively large doses. Doses of one or two grammes daily in pneumonia might simply induce tolerance of the pneumococcus to the drug, so that if meningitis ensued increased dosage would be without effect. If no clinical improvement resulted after three or four days' treatment with sulphonamide it should be discontinued. Failure might be due to a resistant organism, such as *Streptococcus fæcalis*, a resistant strain or a focus of infection. Sulphonamide therapy did not replace surgical measures and the presence of dead tissue was probably inhibitory. Recent work indicated that the susceptibility or resistance of different strains might be tested *in vitro*. The possibility of prophylaxis with sulphonamides in maternity cases involving special risk of infection was being investigated at Queen Charlotte's Hospital (Hoare, 1939).

DR. M. D. SILBERBERG said that Miss Tolhurst had adequately dealt with the pharmacology of sulphanilamide and the various infections in which it was beneficial. Thirty-three patients suffering from pneumonia admitted to the Alfred Hospital had been treated with some form of the drug. The cases could not be submitted to satisfactory statistical analysis, but the impression remained that "M & B 693" ("sulfapyridine" in the American medical literature) was a valuable drug. It was necessary to give it early and in doses large enough to raise the concentration in the blood rapidly. Five grammes were given in the first twenty-four hours, then three grammes daily for the next six days; the fluid intake was restricted in the first twenty-four hours.

"M & B 693" was useful not only in pneumococcal infections, but also against meningococci and gonococci. "Proseptasine" and "Soluseptasine" had been very efficacious in a severe case of ulcerative colitis and also in terminating prolonged pyrexia in a case of pleural effusion which was at first thought to be tuberculous in origin. No beneficial results to date had been obtained in cases of subacute infective endocarditis. Opportunity had not presented itself to confirm the good results claimed by others in the treatment of undulant fever. Patients with tonsillitis and septicæmia had satisfactorily responded to various forms of sulphanilamide.

Concerning toxic symptoms, Dr. Silberberg said that vomiting, headache and anorexia were the most troublesome. Mild degrees of cyanosis had occurred and a few patients had skin rashes of morbilliform type; no cases of serious anæmia had occurred so far. According to investigators, the production of porphyrin might be a cause of photo-sensitivity and dermatitis. With reference to other conditions, Dr. Silberberg said that the evidence was not clear that patients with rheumatic fever were in any way benefited, and the same remark applied to virus infections. Probably sulphanilamide was useful as a preoperative prophylactic in dental extractions, tonsillectomy and other operations, in which bacterial invasion of the blood stream might be expected.

DR. M. RENOU said that his part in the discussion was to bring to the notice of those present the excellent results which were being obtained in the treatment of acute gonorrhœa in the male with "M & B 693" (2-sulphanilylaminopyridine). For this purpose he had analysed the patients treated and discharged as cured from the venereal diseases clinic at the Alfred Hospital during the past twelve months. The number of patients treated with "M & B 693" was small (53); and although realizing that no reliable or accurate statistics could be gleaned from such a small number, Dr. Renou found that the results followed fairly closely those of overseas clinics whose figures had been reported, notably those of Bowie, of the Public Health Department of Aberdeen, and of V. E. Lloyd, of Guy's Hospital.

Dr. Renou said that it was interesting to note that five years earlier, over a period of six months, the number of patients attending the venereal disease clinic each night averaged 73, whereas during the first half of 1939 the nightly average had fallen to 28. The number of patients being treated for syphilis had remained fairly constant, and also the number of new patients with gonorrhœa presenting themselves for treatment had not varied in any great degree. During that period the length of time occupied in the treatment of the syphilitics had not shortened; therefore it was obvious that the fall in numbers was due to the fact that patients with gonorrhœa were being discharged as cured much more rapidly.

In the pre-sulphanilamide days the average time taken to obtain a cure was nineteen weeks. Dr. Renou showed a lantern slide dealing with a series of 22 successive patients with gonorrhœa treated in the hospital. These patients had been treated in the usual way, with anterior and later posterior urethral irrigations of potassium permanganate solution, 1 in 8,000, and it was seen that the time from the commencement of treatment to the cessation

of urethral discharge varied greatly, the average being six weeks. In every case in which the discharge did not clear up in from three to four weeks, posterior urethritis and prostatitis had developed; in other words, it developed in nine out of 22 cases, or 41%.

Dr. Renou went on to say that since the beginning of 1939 "M & B 693" had been used as a routine measure in the treatment of all new patients with gonorrhœa. At that time the patients who were progressing favourably on routine irrigation treatment were not changed over, but those whose progress was unfavourable were treated with the new preparation. Of that group there were only five whom Dr. Renou had been able to trace. He showed a second lantern slide, which indicated that after the new treatment had been instituted recovery was fairly rapid and no further complications developed. In all cases, the dosage administered was that advised by May and Baker: there was one course of treatment only, lasting in all eight days, two tablets (one gramme) being given by mouth three times a day for four days, and one tablet (half a gramme) three times a day for the succeeding four days. At first daily urethral irrigations were performed concurrently, but as the disappearance of the urethral discharge was so rapid in practically all cases, they were soon abandoned.

Dr. Renou then showed a third lantern slide, setting out a series of fifteen successive patients with acute gonorrhœa treated on the lines described. In no case were there any complications; the disease was apparently killed before it had migrated out of the anterior portion of the urethra, and there were no relapses, despite the fact that a large sound had been passed, and the patients had been allowed to resume their ordinary diet and mode of life for at least a week before they were discharged from hospital. A colleague had told him that in a number of his cases, although the patients had been clinically cured for a week or two, a recurrence of the urethritis had followed dilatation of the urethra and the opening of the ducts of Littré's glands by the passage of a large sound. That, however, had not been Dr. Renou's experience.

Dr. Renou remarked that it was interesting to note the rapidity with which the urethral discharge ceased after the commencement of treatment. The patients presented themselves for examination at weekly intervals only, and in twelve of the fifteen cases, one week after the patients' first appearance at hospital, the urine showed neither threads nor pus in either glass in the two-glass test, and the urethral discharge had ceased. The usual story was that all discharge had stopped in one and a half to two days after the first tablet had been taken, and in this small group of cases the average time taken for the discharge to cease was four days. The average time of attendance at hospital until the patients were discharged as cured was six weeks.

Dr. Renou said that his experience of the treatment of acute gonorrhœa with other sulphonamides (sulphanilamide and "Uleron") was negligible; but it was quite evident from a study of the literature and of his own minute series, that the employment of "M & B 693" as soon as a diagnosis was made, led to the rapid cessation of symptoms and to a very great lessening of complications due to the extension of the disease. Lesser toxic manifestations, chiefly headaches and mild anorexia for a day or two, were not infrequent; but Dr. Renou had not seen one case in which cyanosis or serious toxic effects developed.

Correspondence.

PROTECTION OF PRACTITIONERS' INCOMES.

SIR: The Council of the New South Wales Branch has submitted two schemes for the financial part of the scheme for the protection of medical practices in war time. Under one scheme all practices in a group are to be amalgamated and worked as one big partnership and the shares distributed on the basis of the value of the practices at the inception of the partnership, irrespective of the work done by each partner. To overcome this objection an alternative method of distribution on the basis of work done has been suggested. In this a complicated formula has been worked out and it approximately covers the method of distribution.

It appears to me that, if a nominal pool is formed to give an idea of the value of each practice concerned and its relation to the whole, a simpler method of paying the absentee could be considered. In the example quoted by the Council the absentee practitioner has a practice that is worth 20% of the pool, and it seems that if each of the remaining practitioners in the group were to make a levy of 20% of their gross takings the absentee practitioner would then receive his 20% of the pool with a minimum of interference with the remaining practices. In addition this has the advantage that the man who does the greater share of the absentee's work does not suffer unduly. This levy could be made at regular intervals and thus assuring the absentee of a regular contribution to his income while he is away on service.

Another aspect that is worthy of some consideration is that these figures are all worked out on a basis of gross income, but it can be considered that it costs a minimum of 20% of the gross takings in expenses such as are unavoidable in the conduct of a practice and which the absentee would not have to bear, so that it would not be unreasonable to make the levy 20% less to bring the absentee's income up to that which he is accustomed to receiving. Under these circumstances the amount of the levy to be paid by each of the practitioners would be 80% of the absentee's proportion, and in the example quoted would be 16% of the gross takings. This could be paid each month to the absentee's trustee, and thus avoid the expense of administration of a pool only relying on the honesty of each man to keep his accounts in an accurate manner.

Yours, etc.,

E. FARRAN.

741, Young Street,
Albury,
New South Wales.

January 1, 1940.

A REVIEW OF THE PHYSICAL CONDITION OF 130 RETURNED SOLDIERS SUFFERING FROM THE EFFORT SYNDROME.

SIR: In your December 16 number Dr. R. Whishaw has gone to some trouble to throw enlightenment upon the very vexed question of what is commonly called "D.A.H." or effort syndrome. For a thorough understanding of this syndrome, which could be better called the "toxic syndrome", we must go to the basic principles of the sympathetic nervous system. Sir Walter Langdon Brown pointed out some years ago that fear and infection functioned alike, as they each induced a response from the sympathetic nervous system, with increased pulse rate *et cetera*. The cardiac condition of these cases is practically identical with that of toxic goitre, and, as Dr. Whishaw says, can frequently be seen in people who have never been to the war, or even have any thyreoid enlargement. Dr. Whishaw has drawn attention to the rather high proportion of foci of infection in these cases; but he has apparently, like so many others, confined his attention to the tonsils, teeth and prostate, overlooking the sinuses, as he makes no reference to them. My own observations have shown that 25% of sick people seeking treatment have sinus infection, and for some reason or other this infection is more prone to produce this syndrome than any other, perhaps because it is in the area supplied by the superior cervical ganglion. Such being the case, the incidence of infection in these cases must be even higher than Dr. Whishaw quotes, so one can understand that 25% of the cases that had their tonsils and teeth attended to might fail to respond and so lead to the conclusion that foci of infection had little to do with the condition. The two main factors that stimulate the sympathetic unduly

are apprehension and infection. The returned soldier in many cases has been subjected to severe mental strain and in a large proportion of cases is suffering from some of these infections as well. Having been dealing with these cases for over twenty-five years, my experience differs from Dr. Whishaw's in that I have found that the removal or cure of infections has been productive of extraordinarily good results. But I do realize that, once this mechanism has been unduly over-stimulated, it takes very little mental upset to cause a return of the symptoms and, in goitre cases, to bring about an enlargement of the thyreoid. A clear understanding of this syndrome is important, as without it proper and adequate treatment cannot be given.

Yours, etc.,

SYDNEY PERN.

Ballarat,
Victoria,
January 2, 1940.

EMOTIONAL FACTORS IN GENERAL MEDICINE.

SIR: Distance makes it inevitable that comment of mine on an article in the journal, just received, should be long delayed.

Neurologists must be indebted to Dr. Mühl for the lucid way in which in her article of September 2 she has expounded for us the control of body chemistry by the sympathetic and parasympathetic nervous systems. It is, however, especially about the psychological implications of the article that I write.

It is, of course, an old story that emotion influences bodily function; but it is a fresh emphasis which Dr. Mühl introduces into psychological medicine when she says so emphatically: "I am positive that chronic states which are the results of submerged fear are very different from those chronic states which result from intensive submerged hate." It may be said: "Why, of course, anyone who knows anything at all about human nature knew that anyway." Perhaps so; but we are so apt to fail to correlate facts of everyday experience with scientific practice.

That different emotions bring about differing end-results of bodily ill health is indeed an important fact to bear in mind. Another important and paradoxical fact is that similar emotions produce widely different results—this difference dependent on the make-up of the individual concerned. In my Beattie-Smith Lecture (THE MEDICAL JOURNAL OF AUSTRALIA, May 16 and 23, 1936) I suggested that there are two contrasting types of make-up. One of these I characterized as the "compartmental", the other as the "spill-over". In the former, emotion seems to be shut up within the voluntary (exterofector) nervous system—special instrument of the conscious psyche. In the "spill-over" type emotional energies pass over from the exterofector system into the autonomic (interofector) system and thence write themselves into the viscera and also, as Dr. Mühl has told us, into body chemistry. Observation leads me to think that the Chinese race tends to be predominantly compartmental, the Jewish race "spill-over", with the Anglo-Saxon in an intermediate position.

Dr. Mühl, in company with all modern psychologists, finds the unconscious as the black culprit in these cases. I think I see the point and admit much truth in the contention; but I venture on a heresy. Whatever the knowledge of the situation possessed by the patient and his doctor, this much is sure: the friends of the patient, and particularly his rather unfriendly critics, have the shrewdest sort of recognition of where the trouble is; the matter is canvassed as soon as the patient's back is turned.

Does the patient himself know? I think we must answer both yes and no. In the *locus classicum*, where the deeper implications of this problem are dealt with, it says: "Knowing . . . they refused to have . . . in their knowledge" (Saint Paul's letter to the Romans). The heart does know its own bitterness and its shame, and often it refuses to face reality, and then—there surely is a mess. The oldest story in the world is as interesting as it is illuminating in its account of this matter of the known and the purposely hidden: "And the eyes of them both were opened, and they knew that they were naked; and they sewed fig leaves together and made themselves aprons . . . And the Lord God called unto the man . . . and he said I was afraid because I was naked and I hid myself." Whether this be history or allegory, what could be better description of the attempt first to cover one's real self and then to hide from God.

But in contrast with the cases where the disastrous complication of subterfuge has become the most serious factor, there are, I am convinced, innumerable cases where the true psychic cause of the illness is exactly where it appears to be—in the centre of the patient's consciousness. By sleepless night and haunted day the grim reality of his situation is preying on the man's mind and assailing his body. What the man needs is not at all more recognition of his problem, but release from its intolerable assault.

To return to the former class of case. Dr. Mühl attaches great importance to the recalling of long-forgotten and hidden memories. She quotes, and fairly quotes, the great benefit which she herself has seen on numerous occasions after this procedure. But I venture to think that the most important thing that has been effected is not so much that this one particular incident, as such, has been revealed (though doubtless it is an important fact in the patient's total personality), but that Dr. Mühl has at long last and for once at least in his life induced the patient to face naked reality about himself. Much in psychoanalytical procedure which otherwise would be little better than abracadabra is a method for producing an atmosphere where the patient is induced to abandon his instinctive restraints.

There is an oft-quoted instance concerning forgotten and revived memories, related by Rivers. A British officer suffering from claustrophobia was relieved after there had been revealed the forgotten memories of an encounter in childhood with a fierce dog in a dark tunnel. Even so, all children who have been frightened in the dark in a room do not develop a claustrophobia in after life. Is not the significant thing revealed about this man and the child who was father to the man, just this, that in a difficult and dangerous situation he becomes morbidly afraid. He is that sort of a character; such is his fundamental and instinctive reaction, and any treatment which is to deal fundamentally with the situation must at the very least recognize that fact. Nor is even this by any means enough.

If a house is to be well built on firm foundations, it is necessary first to clear away the loose earth and rubble; but all the clearing in the world does not build a house. So in psychotherapy. After exposure and removal of shifting sands of make-believe there still remains the still more important requisite, if health is to be built up, of bringing to a patient, whose efforts to date have spelt failure, an integrating and life-giving principle. It is I believe the most fundamental thing in psychotherapy, and indeed in all medical practice, clearly to recognize and successfully to apply that principle. Can one give it a name? Lord Bacon was, I think, working towards its recognition when he wrote: "The inquiry of truth, which is the lovemaking or wooing of it, the knowledge of truth, which is the presence of it, and the belief of truth, which is the enjoying of it, is the sovereign good of human nature." I would add: Assuredly it is also the sovereign remedy for human ills.

In simplest and most general terms: the ultimate principle which the healer is called on to mediate to the sick is discovered to be the open secret of 2,000 years.

First it is necessary that there be (as the Greek puts it) a "metanoia", a change of mind. The English translators rendered it "repentance". Freud was near to it when he writes of "catharsis and transference".

Secondly, a new dynamic is needed. That new dynamic is faith, and the object of faith can be nothing less than absolute and living truth. The great Teacher and Healer of mankind brought to His patients, as His sovereign remedy, faith in an all-wise and almighty Providence, who, He said, was also loving Father. It may well be said that a scientific medical profession is called on to ask proof and credentials about suggested remedies. The demand is

proper; the evidence is accessible. The evidence of the visible is in the looking; the evidence of the tangible is in the touching; the evidence of the serviceable is in the using; the evidence of the trustworthy is in the trusting. In the nature of the case there can be no other evidence; but it is conclusive. I myself have obtained this sort of evidence. I have also been privileged to mediate it to others, and with remarkable results. It should go almost without saying that there is nothing implied here to suggest neglect of the available resources of man's increasing knowledge of and control over Nature; these themselves are the result of man's faith in an understandable, rational and controllable order in Nature. Such use is not contrary to, but corollary of, a practical faith in the Creator of things and the Giver of life.

A final note. Dr. Mühl indicated something of the complexity of biochemistry. We cannot possibly expect forthwith to achieve a synthetic imitation of the whole chemical life process. Fortunately we are called to no such prodigy of superhuman skill; for we are dealing with life, whose property is to be self-regulating, self-integrating, self-directing towards wholeness and health. Remove gross obstruction, establish connexion (by faith) with the source of life, and one may confidently expect such corrected bodily chemistry as will in its turn result in health.

Here to our hands is the *vis naturæ medicatrix*, the elixir of life.

Yours, etc.,

CHAS. McLAREN.

Australian Presbyterian Mission,
Paton Memorial Hospital,
Chinju (Shinshu), Chosen.
October 3, 1939.

REFUGEE DOCTORS.

SIR: *The Sydney Morning Herald* returns to the attack this morning in a sub-leader entitled "Prejudice Triumphant", and designating as "unfair and ridiculous the distinction between German and Austrian doctors". Because of this and the fact that the editor of *The Sydney Morning Herald* declined it, I am reluctantly compelled to ask you to publish the following letter, sent about one month ago to that journal.

The Editor,
S.M.H.

Sir: I cannot allow Dr. Mary Burfitt-Williams's letter to pass, as it savours of, we'll say, terminological inexactitude. Dr. Maxwell had not in mind one or even several of the gentlemen as indicated by her, and certainly not those of Austrian or non-enemy parentage. And it is safe to assume that if Dr. Maxwell queried the credentials of one or two he had just grounds. What I and others object to is that you should class as churlish or Pecksniffian "the attitude which debars German-born immigrants from practising here because of the war". [These are *The Sydney Morning Herald's* own usage.]

Admittedly the refugee doctor is the victim of Nazi philosophy, but he was a proud and loyal German before its advent and will be again when it is overthrown. We must remember that this latter achievement may not end our conflict with Germany. Merely the régime will be changed. What then? We have enemy subjects under contract and in the pay of the State. Rancours and hates may by that time have gravely developed, and these doctors may then find themselves the victims of that very irrational and hysterical clamour that now grieves for them. No doubt the professional amenities and courtesies are unavailable to them, and many could be assimilated, with advantage to the medical profession and the community. Their cause is not likely to be assisted by correspondents of obscure identity. The Government knows perfectly well that these are legion and comprise those with a legitimate grievance against and those with just a silly and senseless antagonism towards the medical profession.

Where, O where, is our intellectual moral fibre that finds it necessary to indulge in an apologia for our fairness? Have we forgotten the increased numbers of our very own who entered the medical school after the last war?

Pecksniff may have been an unctuous hypocrite. He wasn't stupid.

Yours, etc.,

W. J. McCRISTAL.

Lindfield,
New South Wales,
January 10, 1940.

Post-Graduate Work.

SPECIAL COURSE FOR MEDICAL OFFICERS OF DEFENCE FORCES.

THE special course for medical officers of the defence forces and medical officers on the reserve list arranged by the New South Wales Post-Graduate Committee in Medicine will be repeated during the fortnight commencing on February 5, 1940. Instruction will be given at the Prince Henry Hospital, the Department of Anatomy of the University of Sydney, the School of Public Health and Tropical Medicine and the New Medical School, University of Sydney. A copy of the programme may be obtained from the Secretary of the New South Wales Post-Graduate Committee in Medicine, the Prince Henry Hospital, Little Bay, with whom persons desiring to attend the course are requested to communicate as soon as possible.

Obituary.

SYDNEY LEICESTER COOK.

WE regret to announce the death of Dr. Sydney Leicester Cook, which occurred on January 8, 1940, at Brisbane.

JOSHUA LAW KERR.

WE regret to announce the death of Dr. Joshua Law Kerr, which occurred on January 7, 1940, at Stratford, Victoria.

Books Received.

GENERAL PRACTICE SERIES: COMMON SKIN DISEASES, by A. C. Roxburgh, M.A., M.D., B.Ch., F.R.C.P.; Fifth Edition; 1939. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 431, with 8 plates in colour and 179 illustrations in the text. Price: 15s. net.

OUTLINE OF PHYSIOLOGY, by W. R. Amberson, Ph.D., and D. C. Smith, Ph.D.; 1939. Baltimore: The Williams and Wilkins Company. London: Baillière, Tindall and Cox. Super royal 8vo, pp. 420, with 177 illustrations. Price: 22s. net.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Epstein, Benjamin, M.B., B.S., 1938 (Univ. Sydney), St. George District Hospital, Kogarah.

Hinder, David Clive Critchley, M.B., B.S., 1939 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Gatenby, Alfred Ernest, M.B., B.S., 1938 (Univ. Sydney), Biological Department, Sydney Hospital, Sydney.

Hicks, Nina Patty, M.B., 1938 (Univ. Sydney), 4, O'Connor Street, Haberfield.

O'Donohue, Russell Markham, M.B., 1939 (Univ. Sydney), Cross Street, Guildford.

Poidevin, Leswyn Oswyn Sheridan, M.B., B.S., 1938 (Univ. Sydney), "Delaida", Victoria Road, Bellevue Hill.

Samuels, John Harris, M.B., B.S., 1939 (Univ. Sydney), 4, Lang Road, Centennial Park.

Tonge, John Iredale, M.B., B.S., 1940 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Walters, Lynn David, M.B., B.S., 1937 (Univ. Sydney), c.o. Dr. D. F. Walters, Nananga, Queensland.

Warburton, Colin, M.B., B.S., 1937 (Univ. Sydney), c.o. Dr. H. M. Owen, 57, Darlinghurst Road, King's Cross.

Lovell, Bruce Tasman, M.B., B.S., 1933 (Univ. Sydney), Werris Creek.

Pockley, Francis John Antill, M.B., B.S., 1936 (Univ. Sydney), 233, Macquarie Street, Sydney.

Baird, Roy Fearon, M.R.C.S. (England), L.R.C.P. (London), 1897, Norfolk Island.

Robson, Graeme Alvin, M.B., B.S., 1939 (Univ. Sydney), 4, Milner Street, Mosman.

Meek, Victor Robertson, M.B., B.S., 1938 (Univ. Sydney), Lismore Base Hospital, Lismore.

Diary for the Month.

JAN. 24.—Victorian Branch, B.M.A.: Council.
JAN. 24.—Queensland Branch, B.M.A.: Council.
JAN. 26.—Tasmanian Branch, B.M.A.: Council.
FEB. 1.—South Australian Branch, B.M.A.: Council.
FEB. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
FEB. 7.—Victorian Branch, B.M.A.: Branch.
FEB. 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
FEB. 13.—Tasmanian Branch, B.M.A.: Branch.
FEB. 15.—Western Australian Branch, B.M.A.: Council.
FEB. 20.—New South Wales Branch, B.M.A.: Ethics Committee.
FEB. 23.—Tasmanian Branch, B.M.A.: Council.
FEB. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
FEB. 28.—Victorian Branch, B.M.A.: Council.
FEB. 29.—South Australian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xix.

AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Officers.

HORNSBY AND DISTRICT HOSPITAL, HORNSBY, NEW SOUTH WALES: Relieving Honorary Consulting Gynæcologist.

MATER MISERICORDIÆ PUBLIC HOSPITALS, BRISBANE, QUEENSLAND: Resident Medical Officers.

QUEEN VICTORIA MEMORIAL HOSPITAL, MELBOURNE, VICTORIA: Female Resident Medical Officers.

ST. GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Medical Officers.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Temporary Honorary Relieving Assistant Orthopædic Surgeon.

THE UNIVERSITY OF MELBOURNE, VICTORIA: Stewart Scholarship in Medicine.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Honorary Clinical Assistant.

THE RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES: Female Medical Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	Associated Medical Services Limited. All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Federated Mutual Medical Benefit Society. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	Wiluna Hospital. All Contract Practice Appointments in Western Australia.

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